ANALYSIS OF DAIRY MARKETING CHAIN: IN THE CASE OF GONDAR CITY, AMHARA REGIONAL STATE, ETHIOPIA

MSc. THESIS

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ANALYSIS OF DAIRY MARKETING CHAIN: IN THE CASE OF GONDAR CITY, AMHARA REGIONAL STATE, ETHIOPIA

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STATEMENT OF THE AUTHOR

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BIOGRAPHICAL SKETCH

The author was born from his father Ato Tsegaw yigzaw and his mother W/o Serayet Beyen on 15 November 1983, in Debark, North Gondar of Amhara Regional State. He attended elementary school in Gondar and Debark primary School and continued his Debark high school in North Gondar Zone. He joined Alage TVET College of Agriculture in 2002 and obtained his Diploma in Animal Science in 2004. Then he has served at worda Agriculture Development in different parts of the worda and federal level at various positions. Then he joined Bahardar University in 2005 to pursue his B.Sc study and graduated in Animal Science in 2006 he also joind in Yardistic International Distance Collage in 2005 to pursue his BSC study and graduated in Agribusiness Develop and Management. Finally, he joined the school of Graduate Studies of the University of Gondar in 2015 to pursue his M.Sc degree in Agricultural Economics. He has been working for 12 year in Adarkaye worda agriculture office and Gondar town agriculture office and from 2016 up to now in federal minister of livestock and fishery in senior expert.

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LIST OF ACRONYMS

AADAP	Adis Abeba Dairy Producer Association
AGDP	Agricultural Gross Domestic Product
CADU	Chilalo Agricultural Developmental Unit
CC	Contingency Coefficient
CSA	Central Statistical Agency
CC	Contingency Coefficient
CSA	Central Statistical Agency
DDE	Dairy Development Enterprise
DDA	Dairy Development Agency
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
OLS	Ordinary Least Squares
RESET	Ramsey Regression Equation Specification
SARI	South Agricultural Research Institute
SCP	Structural Conduct Performance
AIDA	Swidish International Development agency
SDDP	Small holder Dairy Development Pilot Project
SPSS	Statistical Package For Social Sciences
TGMM	Total Gross Marketing Margin
TLU	Tropical Livestock Unit
UNRRA	United Nation relief and Rehabilitation Administration
VIF	Variance Inflation Factor
WFP	World Food Program

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ABSTRACT

Dairy is an important source of food, cosmetics and common marketable form of dairy product in the study areas. Therefore, the purpose of this study was Analysis Dairy marketing chain in Gondar city, region of Amhara, Ethiopia. With the specific objectives of identifying marketing channels, quantify margin for key marketing channels and identifying factors affecting market participation decision and marketable supply of milk. Constraints and opportunities of milk production and marketing of in the study area were also assessed. The study was based on the data collected through rapid market appraisals and survey of 204 milk producer and 24 milk and butter traders sample selected. To address the aforementioned objectives descriptive statistics and econometric models were employed. The result showed that 73.5% of sampled dairy household were identified to be milk market participants and about 26.4% of milk produced by sampled household was not supplied to market. About 6.35%, 5.7%, 80%, 5.33% and 1.9 % producer of the milk was supplied to the market particularly retailers, rural assembler, cooperative and hotel and restaurant respectively. Whereas butter supply to market 19.8 %, 17.2%, 7.2%, 53.9% and 1.7% of the butter was supplied to the market particularly retailers, rural assembler, hotel and restaurant and semi-wholesaler and producer respectively. The S-C-P model identified that the markets for milk and butter in the study area was non-competitive type. The Heckman two-stage econometric estimation procedure was employed to identify factors that determine milk market participation decision and milk sale volume of the farm household in the area. The first step of the Heckman two stages procedures results showed that dairy household milk market entry decision was strongly and significantly affected by size of milk output, family size. access to market information, total land size and access to feed In addition, the second stage estimation result revealed that marketable milk volume was found to be strongly and significantly affected by size of milk output, age of the household, family size and financial income from non-dairy source of sampled dairy household. Generally, milk and butter market in the study area seemed to be inefficient and underdeveloped. Thus, dairy development interventions should be aimed at addressing both dairy production technological gaps and marketing problems. Furthermore, dairy processing industries establish, dairy producers and trader cooperatives, and improving access to services should receive due attention to improve dairy production and marketing.

***Key words**: Heckman two-stage model, milk market participation, level of participation and market*

1. INTRODUCTION

1.1. Background of the Study

Ethiopia, like most of the countries in sub-saharan Africa is heavily dependent on agriculture. The agricultural sector plays an important role in the overall development of the country's economy. The sector plays a major role in the national economy and it is the source of income and employment for the rural population. Despite of the fact that agriculture in Ethiopia contributed about 44% of the national GDP and 83% of exports, the livestock sector contributed about 32 % of agricultural GDP and drought animal power is critical for all farming system. More recent figure indicated that the livestock sector contributed about 12% of national GDP and 26% of agricultural GDP CSA, (2013)

According to the Central Statistical Agency CSA ,(2013) Ethiopia has one of the largest livestock inventories in Africa with a national herd estimated of 54 million cattle, 25.5 million sheep, 24.06 million goats, 11.56 million pack animals and 47.37 million poultry. Out of 54 million cattle population, almost 99 % of total cattle are local breeds and the remaining few are hybrid and exotic breeds that accounted for about 0.94% and 0.11% respectively (CSA, 2013).

The major species used for milk production in Ethiopia are cattle, camel and goats. Cattle produce 83% of the total milk and 97 % of the cow milk comes from indigenous cattle breeds. The total population of animals used for milk production is 13,632,161 TLU. Although milk production is increasing by 1.2% per annum, the demand-supply variance for fresh milk is ever widening and the per capita consumption is diminishing (CSA, 2012).

However, a number of fundamental constraints underlined the livestock production and productivity outcomes. These include traditional technologies, limited supply of inputs (feeds, breeds, stocks, water), poor or non-existence of extension services, high disease prevalence, poor marketing infrastructure, and lack of market services (Berhanu et al, 2007). The low productivity of the country's livestock production system in general and the traditional sector in particular is

mainly attributed to shortage of crossbreed dairy cows, lack of capital by dairy producers, inadequate animal feed resources both in terms of quality and quantity, unimproved animal husbandry systems, inefficient and inadequate milk processing materials and methods, low milk production and supply to milk processing centers and poor marketing and market information systems FAO, (2011)

The low marketable milk output in Ethiopia poses limitations on the possibilities of exploring distant but rewarding markets due to high transaction costs arising from transportation and high opportunity cost of labor involved. Again, dependable marketing system is not yet developed to market milk and milk products. Producers and consumers are spatially separated; most producers are found in the rural areas while consumers or profitable market is found in urban areas. Most of the milk supply is distributed from producer to consumer through informal marketing channels in both rural and urban areas. Market infrastructures and marketing facilities are not well developed in the country. This, in turn, reduces incentives to participate in economic transactions and results in subsistence rather than market-oriented production systems. Therefore, improving the position of smallholders to actively engage in the dairy market is one of the most important development challenges of the country (Holloway *et al*., 2002).

The existing excess demand for dairy products in the country is expected to induce rapid growth in the dairy sector. Factors contributing to this excess demand include the rapid population growth increased urbanization and expected growth in incomes. With the shift towards market economy and liberalization policies, private entrepreneurs are expected to respond to the increased demand through increased investment in dairying and milk processing. While the response of the private sector to the increased demand for dairy is expected to be significant, the small-scale household farms in the highlands hold most of the potential for dairy development (Woldemichael, 2008)

Like most developing countries, Ethiopia's increasing human population, urbanization trends and rising household incomes are leading to a substantial increase in the demand for livestock products, particularly milk and meat. In order to meet the growing demand for milk in Ethiopia, milk production has to grow at least at a rate of 4 percent per annum (Assaminew and Eyassu, 2009). Milk production is an essential livestock-sector activity. Previously, the demand for milk

were decided by the number of people, while at this time it is gradually determined by the increasing per capita income for milk consumption in the developing countries.

1.2. Statement of the Problem

In Ethiopia, dairying is a means of providing an additional source of food, income to small and marginal producer and employment. Milk provides relatively quick returns for small-scale livestock keepers and is a balanced nutritious food important for household food security (Polak *et al*., 2008). However, in Ethiopia per capita consumption of dairy is very low, well below international benchmarks. Because world and Africa average per capita consumption of dairy is 105 and 40 liters respectively whereas Ethiopian annual milk consumption is less than 19 liters per annum, per capita. So, the consumption of milk is low compared to the African and world averages AGP, (2013). The huge potential of dairy development clearly indicates that there is ample opportunity to improve the sector. The high potential of dairy development, progress and success has been slow compared to the progress made in Kenya with an almost similar environment.

Milk products in Ethiopia are channeled to consumers through both formal and informal marketing systems. Estimated to 95 percent of the marketed milk at national level is channeled through the informal system. The informal market involves direct-delivery of raw, fresh milk to consumers in the immediate neighborhood and sale to itinerant traders and nearby institutions FAO, (2011).

According to USAID (2013) research effort to increase milk and milk product market have been under way in Ethiopia. A review of past research work indicated that there are many milk producers and much opportunity to produce milk and milk product. However, inability to supply milk and milk product: Costs of marketing are usually high due to poorly developed physical and institutional facilities, limited credit service, On the other side fluctuation the demand for milk and milk products declines during the fasted period of the Ethiopian Orthodox Church as this population abstains from consuming animal products, it also most producers complain that is price of milk is increasing rapidly and they are finding it increasingly difficult to purchase milk

and milk products. About 92% of the cafeterias/hotels and 91.46% of consumers covered stated very high price of dairy products was due to, lack of market outlets for milk. This would result in high risk of marketing and high barriers to growth, and poorly motivated producers. Most producer and traders could not able to earn revenue equivalent too their expenditure due to lack of pertinent market information.

So the purpose of this study is to identify the bottleneck and come up with precise possible solution to give vital and valid information on the operation and efficiency of dairy product marketing system for effective research, planning and policy formulation." It also to identify what dairy marketing chain looks like in Gondar city''. So that this study was intend to fill the gap of the lack of knowledge about dairy sector in Gondar city.

Therefore, the study conducted to contribute filling the gap between the demand and supply and information gap of dairy product by investigating dairy market channel and factors affecting volume of milk supply, milk market participation decision by dairy household, milk and butter marketing channel, quantify marketing cost and margin for milk and mild market participants, dairy trader and major constrains of dairy product in Gondar city.

1.2. Objective of the Study

The general objective of this study was to analyze dairy marketing chain in Gondar city

The specific objectives of the study were:

1. To identify the major dairy market channels?
2. To analyze the performance of milk and butter marketing
3. To identify factors affecting milk market participation decision
4. To identify factors affecting volume of milk supply by dairy household

1.3. Research question

The study has attempted to answer the following question

1. What are the major dairy market channels in the study area?
2. What are the level of performance of milk and butter marketing?
3. What are the factors affecting volume of milk supply by dairy household?
4. What are the factors affecting milk market participation decision by dairy household?

1.4. Significance of the study

This study is important as it tries to verify nature of dairy market chain and determinants of participation decision, volume of milk supply and the main challenge of dairy marketing. Therefore, the findings of this study would be useful to help policy makers in designing appropriate policies for private investment and nongovernmental organizations that are engaged in the development of dairy sub-sector. The study also serves as a useful reference for researchers and other personnel interested.

1.5. Scope and Limitations of the Study

This research study was carried out only in Gondar city; hence its scope is limited. Moreover, the study was not including the whole Kebele Administrations of the District but only 6 representatives because due to financial and time constraints. The study was focus on only major dairy derivatives (fluid milk and cooking butter) supply and marketing chains analysis in the study area. The study used cross sectional data that was obtained through a single survey (interview), for the year 2017. Therefore, the result of this study was interpreted in light of these couple of limitations.

2. LITRATURE REVIEW

In this section the basic concepts of market, marketing, market channels, approaches to study marketing system, overview milk and butter marketing in Ethiopia factors affecting market supply and constraint of milk marketing would be discussed.

2.1. Basic Concepts

Market: is an institution or mechanism which brings together buyers ("demanders") and sellers ("suppliers") of particular goods and services. As a basic definition, marketing is the process of satisfying human needs by bringing products to people in the proper form and at the proper time and place. According to (Barson and Norvell , 2005). Marketing has an economic value because it gives form, time, and place utility to products and services. As products definition it is the performance of all the transactions and services associated with the flow of good from the point of initial production to the final consumer. As business firm marketing is as a complete management concept through which the company sells itself as well as its line of product. And from the view point of society, it is defined as all the process necessary to determine consumers' physical and societal needs and to conceptualize and affect their fulfillment Marketing.

Marketing: According to Saiyed (2009), marketing means the getting together of buyers and sellers in person or any by mail or telephone, or through any other means of communication. Marketing includes all the impacts involved in the exchange process of transferring the possession and ownership of goods or services from the producer to the ultimate consumers (Sukumar, 2008). Marketing starts with consumer and ends with consumer. Therefore, today's market is called consumer market. It can be defined as, "All the individuals and households who buy goods and services for personal consumption". So, the consumer satisfaction becomes more important in the marketing functions.

The marketing programme covers producer planning or merchandising, price, promotion and distribution. In short, modern marketing begins with the customer, not with production cost, sales, technological landmarks, and it ends with the customer satisfaction and social well-being.

Under the market- driven economy, buyer or customer is the boss. Marketing has been viewed as an ongoing or dynamic process involving a set of interacting activities dealing with a market offering by producers to consumers on the basis of reliable marketing anticipation. Marketing is a matching process by which a producer provides a marketing mix that meets consumer demands of a target market within the limits of society. The process is based on corporate goals and corporate capabilities. Marketing process brings together producers and consumers, the two main participants, in exchange (Saiyed, 2009)

Chain: is the term used to describe the various links that connect all the actors and transactions involved in the movement of agricultural goods from the producer to the consumer (CIAT, 2004). Commodity chain is the chain that connects smallholder farmers to technologies that they need on one side of the chain and to the product markets of the commodity on the other side.

Marketing System: - Is a collection of channels, middlemen, and business activities, which facilitate the physical distribution and economic exchange of goods and services (Kohls and Uhl, 1985).

Marketing channels: - are the sequences of intermediaries through which goods pass from the producers to consumers. They are alternative routes of product flows from producers to consumers (Kohls and Uhl, 1985). Davar (1996) defined marketing channels of distribution as a series of operations, which physically bring goods into the hands of the final consumer. Most frequently, a physical product transfer is involved but sometimes an intermediate marketing institution may take title to goods without actually handling them. Formally, a marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstong, 2003). Market channel of food grain trade activities in AlabaSiraro district was studied by Wolday (1994). The food grain marketing channel among different agents from producer to consumer was studied. Village collectors, wholesalers, agents, and millers are the main agent in this market. The study indicates that smaller proportion of the food grain is dishonored to the market center in the district by village collectors.

Marketing margin: Is the difference between the price received by producers and that paid by consumers or the price of the allocation of marketing services which is the outcome of the demand for and supply of such services (Tomek and Robinson, 1981).

2.1.1 Approaches to Study of Agricultural Marketing

The agricultural marketing study involves mainly three approaches. These approaches are the functional, institutional, and the commodity approaches.

2.1.1.1. Functional approach

This approach investigates marketing in terms of the various activities that are performed to exchange product from the producer to the consumer. These activities are called functions (Cramers and Jensen, 1982). And this approach helps to compare cost and benefits of different functions. The common functions include are: a) exchange (buying and selling), b) physical (processing, storage, and transportation), and c) facilitating (Standardization, financing, risk bearing, and market information). Most of these functions are performed in the marketing of nearly all commodities.

2.1.1.2 Institutional approach

Institutional approach examines the activities of business organizations or people in marketing. The institutional approach focuses on the study of the various institutions, middlemen and other agencies which perform the marketing activities. These organizations or market actors are those who perform the operations necessary to transfer goods from the producer to consumer, because of the benefit of specialization and scale that exist in marketing as well as production (Cramers and Jensen, 1982).

2.1.1.3 Commodity approach

This activity encompasses the above two approaches in the marketing of one or more commodities. This approach focuses on what is being done to the product after its transfer from its original production place to the consumer (Kohls and Uhl, 1985). It helps to pinpoint the specific marketing problems of each commodity as well to develop the market for the specific commodity. The approach follows the commodity along the path between producer and consumer and is concerned with describing what is done and how the commodity could be handled more efficiently. This approach will be used in this study as the investigation integrates the above two approaches to study the poultry marketing chain. This paper uses the commodity approach that integrates the application of the functional and institutional approach to examine the poultry marketing system in the study area.

2.1.2 Approaches to Measure Marketing Efficiency

2.1.2.1 The Structure, Conduct and Performance (SCP) model

SCP model is one of the most common and pragmatic methods of analyzing a marketing system. It analyzes the relationship between functionally similar firms and their market behavior as a group and, it is mainly based on the nature of various sets of market attributes and relations between them and their performance (Scarborough and Kydd, 1992). This analytical method is based on the theory that market structure and market conduct determine the performance of a marketing system.

2.1.2.1.1 The structure of the market or industry

Market structure includes - a) the degree of buyer and seller concentration, defined by the number of buyers and sellers in the market b) the degree of market transparency which refers to the availability of relevant market information, its distribution among buyers and sellers, and its adequacy in terms of price sharpening, quality comparisons and risk reduction or uncertainty about the future c) the condition of entry to the market referring to the relative ease or difficulty

with which seller may enter the market. This is generally determined by the advantages that established sellers have over potential entrants (Clodius and Mueller, 1961). Market structure: it refers to the characteristics of the organization of the market that seem to exercise strategic influence on the nature of competition and pricing within the market. Scarborough and Kydd (1992) and Magrath (1992) evaluated this market or industry structure by examining trends in the number and sizes of firms relative to each other, and to number of customers and producers in particular time and place; the presence, absence, levels and nature of entry barriers; and the distribution of market information and its adequacy in sharpening price and quality comparisons and in reducing risk. The number of firms operating in a particular market or related markets can be indicative of the extent to which buying and selling power is concentrated amongst them. A few large firms can dominate a market and control prices. The concentration ratio, which measures the proportion of total sales in a market by a given firm, can be used to indicate the level of concentration of market share.

2.1.2.1.2 Market conduct

It refers to the behavior of firms the strategy they use individually in competition with other firms in purchasing inputs and selling output, and in conjunction with other firms, which may take the form of informal cooperation or collusion. The principal dimensions of market conduct refers to price setting, the way in which the volume, quality, range of products, advertising and marketing strategy, research, development planning, implementation and legal tactics are determined.

2.1.2.1.3 Market performance

It refers according to (Bain and Qualls, 1987) to the composite of end results which firms in the market arrive at by pursuing whatever lines of conduct they espouse. For firms acting as sellers, these results measure the character of the firms' adjustments to the effective demands for their outputs; for firms buying goods, they measure the quantity of adjustments made by firms to the

supply conditions of the goods they purchase. Time series and cross section price data were used to throw light on performance of the marketing system.

2.1.3 Overview of the dairy product in Ethiopia

2.1.3.1 Historical profile of the dairy sector

According to (Mohamede et al .2004) The policy and regulatory environment that influenced the country's dairy sector can be categorized into three distinct periods, 1960 - 1974 - a free market economic system and the emergence of modern commercial dairying, 1974 - 1991 - the socialist (Derg) regime that emphasized a centralized economic system and state farms and, 1991 to present - the current phase of free market and market liberalization.

2.1.3.1.1 The Emergence of modern dairying in Ethiopia 1960 – 1974

Felleke (2003) stated that the first attempt to introduce modern dairy production in Ethiopia was made in 1947 where 300 Friesian and Brown Swiss dairy cattle were donated by the United Nations Relief and Rehabilitation Administration (UNRRA). Since then, there were a number of initiatives to develop the country's dairy sector. The major ones were: establishment of a milk processing plant at Sholla, Addis Ababa, introduction of exotic dairy cattle breeds by missionaries and foreign individuals and organizations, expansion of the capacity of the Sholla plant to 10,000 liters then to 30,000 liters per day, opening of milk purchasing and collection centers in Addis Ababa and up to a radius of 70 km around Addis Ababa along the main roads, limited extension service, and incentives to well off producers with the support from United Nations International Children Education Fund (Staal, 1995). In 1971, the Dairy Development Agency (DDA) was established to provide guidance and assistance such as provision of extension and credit services to dairy producers to establish commercial dairy farms in areas serving the cities and townships, and improve the quality and increase the quantity of milk and milk products (Ketema, 2000; Zegeye, 2000). With the encouragement of DDA, cooperatives came into existence to undertake commercial agricultural production. Major attempts to improve smallholder dairy production were made by: Swedish International Development Agency (SIDA)

supported Chilalo Agricultural Development Unit (CADU) initiated in 1967. Major achievements of these units consisted of: one cow unit dairy development package, production of frozen cattle semen and crossbreed dairy heifers, introduction of small-scale milk processing units, introduction of AI and bull station services, popularization of improved forage cultivation and establishment of a farm with 290 dairy cattle at WolaitaSoddo currently managed by Southern Agricultural Research Institute (SARI).

2.1.3.1.2 Dairying during Derge Regime (1974 – 1991)

After the imperial period came the socialist regime in 1974, during which some important policies were pursued under a centralized economic system that directly or indirectly influenced the country's dairy sector. These were: Nationalization of land and distribution to peasants through Peasant Associations (PAs) without the right to rent, mortgage or sell. Some large farms were converted into state farms and new ones established. Land allocated to an individual could be taken over by the PAs in order to reallocate it to other families, Promotion of the formation of producers and service cooperatives (Staal, 1995), Establishment of the Dairy Development Enterprise (DDE), Increasing the processing capacity of the Sholla plant to 60,000 litres per day with support from the Government of Finland and the United Nations Capital Development Fund, introduction of butter oil recombination capacity, establishment of 30 collection kiosks and 16 chilling centres, and expansion of milk collection routes to 150 km around Addis Ababa, Fixing overvalued foreign exchange rate policy that led exports to become expensive and imports cheaper.

As reported by Haile (2009), cooperatives suffered a loss of credibility by members and the public as they were manipulated into government and political tools rather than instruments for socio-economic development. Members who were forced to form or join the cooperatives became dissatisfied because of the lack of tangible benefits and loss of a sense of ownership with no role to play in their management. This led to the gradual fading away of the cooperatives which became nonfunctional. This situation led to a dramatic increase in the role of the informal market in urban milk supply and demand.

The growing importance of the informal market resulted in a major supply shift from peri-urban landholders to urban backyard producers, who purchased feed from peri-urban areas. Due to the failure of socialized agriculture and following the policy of mixed economy of 1990, producer cooperatives were reorganized by giving them the opportunity to act in a democratic manner and the right to either remain together or not. The result of this was that 95 percent of producer cooperatives disintegrated within three months of the announcement (Lirensso, 1992). Collective property was either divided among members or sold and consequently, a large number of crossbreed dairy cattle came into the hands of small private producers in the urban areas.

2.1.3.1.3 Past derg dairy production

With the downfall of the Dergue regime Ethiopian People's Revolutionary Democratic Front (EPRDF) came to power in1991, Ethiopia has embarked on policy reforms that aim to bring about a market-oriented economic system. It has several macroeconomic policy changes were implemented. Some of the major policy changes had to do with switching the fixed exchange rate system to a more market determined one. The series of devaluations of the local currency since 1992 is believed to have discouraged imports including dairy products (Haile, 2009). A new land policy was introduced in which land remained a national property but usufruct was made tenable for an indefinite period with the right to transfer to children, while selling and mortgaging remained prohibited but temporary leasing was allowed.

The formulation of the dairy development strategy focused on creating an environment for many smallholder dairy farmers to have access to markets in an attempt to stimulate producers to increase their production to meet market demands and satisfy the market. The only official body dealing with dairy policies during this period was The Dairy Development Advisory Board and had the sole task to allocate the funds generated by World Food Program (WFP) from powder milk for dairy development. Financial support used to go primarily towards forage development, expansion of veterinary and AI services, and the supply of feeds and veterinary inputs (Staal, 1995). Following the changes in policy to allow the private sector investment in dairy production, processing and marketing, several small- and medium-scale dairy processing industries were established around Addis Ababa and other urban areas. DDE retained its role as the primary actor in the dairy market. The entrance of the private dairy

processing firms particularly Sebeta Agro-Industry, in the late 1990s offered producers a better milk price as compared to that paid by DDE, there by stimulating competition and helping the expansion of the formal market (Haile, 2009).

Taking advantage of the newly created market opportunities through economic reforms, prominent dairy producers within 100 km radius of Addis Ababa formed the Addis Ababa Dairy Producers Association (AADPA) with the main objective of providing cattle feed (Haile 2009). By the end of 1992, 90 percent of all urban dairy producers were registered. The rural cooperatives were re-established, paying particular attention to human capital, considering that the role of the government in cooperative affairs was not appreciated by the members. A new proclamation in 1998 further helped to promote cooperatives of a new kind by liberalizing them from direct government control and allowing it to only play an advisory role. Among the development projects, implemented the Smallholder Dairy Development Pilot Project (SDDP) with additional funding from FAO and WFP. SDDP identified marketing as the major constraint for dairy development and so organized small milk processing and marketing units to raise income and the nutritional standard of smallholder farmers through improved dairying. About 30 cooperatives were formed in the peri-urban areas of Addis Ababa.

In addition, improvement in veterinary and breeding services, promotion of forage and feed production through the extension services were observed. Macroeconomic policies, changes in cooperative legislation and the openness of the manufacturing sector to private investment all resulted in positive growth in the dairy sector and bolstering in both the peri-urban areas where most development projects were located and in rural areas where mixed farming was practiced (Haile, 2009). A summary of the status of key dairy related policy issues

2.1.3.2 Milk Marketing System in Ethiopia

Market refers to a place where buyers and sellers interact and influence price. Although the market exists, it does not ensure an exchange to take place unless there should be a channel. Milk production is seasonal in pastoral area whereas consumption is throughout the season (IPS,

2000). Additionally, there are insufficient availability of processing techniques, and physical infrastructure, and market facilities in pastoral area. However, since dairy makes more efficient use of feed resources and provides regular income to the producer, dairying is preferred to meet production where there is enough availability of infrastructure and access to market.

Milk marketing is serving as an incentive for farmers to produce more. It stimulates farmers to produce more, increase farmers' income generation and living standards and create an employment opportunity in rural areas (Asaminew, 2007). Generally, there is no a well-developed dairy marketing system in Ethiopia. This is reflected where only 5% of milk produced in rural areas is marketed as liquid milk (Getachew, 2003). This is due to the presence of limited marketing infrastructures such as transport.

According to (Ahmed, et al., 2003) like other African countries (e.g., Kenya and Uganda), In Ethiopia also dairy products deliver and arrive at consumers through both formal and informal dairy marketing systems. Formal milk markets do exist in urban and pre-urban dairy system of Shashemene–Dilla milk shed, and to Addis Ababa (Ahmed, et al 2003; Woldemichael, 2008). Cooperatives and private milk collecting and processing plants which collect milk from producer and deliver to retailers and consumers are participate in the formal marketing system, although there are few cooperatives and their performance are low. The formal market was dominated by the DDE, which covers 12 percent of the total fresh milk in Addis Ababa until 1991 (Holloway, Nicholson, Delgado, Staal and Ehui, 2000). However, in recent time, collecting, processing, packing and distributing milk and other dairy products have begun by private businesses. But, the formal market total production being marketed percentage remains small yet. In Ethiopia, the formal and informal market share and growth in the three phases has been different and the informal market has stayed the dominant one.

Due to the entrance of private sector in the dairy processing industry during last decade, the formal market appears to be expanding in Addis Ababa and Dire Dawa in the eastern part of the country. Two different milk marketing methods use by the dairy producers in the rural lowland agro pastoral system of Mieso: traditional milk associations/groups and individual sellers. According to (Getachew, 2003) in the informal market system, the smallholder sells his/her extra product to neighbors or in the local market either as liquid milk or in the form of butter or

cottage cheese (Ayib) without the announcement of the government. It mostly takes over in the rural areas of the country and part of pre-urban areas. The informal market includes delivery of milk from producer to consumer and traveling traders directly or it may pass through market agents. The informal market system has a characterization of low operation cost, no licensing to operate, high producer price compared to formal market and no regulation of operations.

2.1.3.3 Butter marketing system in Ethiopia

Butter and some dairy products are called yellow fats, which contains a number of products for spreading onto bread or for indirect consumption as ingredients in other foods. There is some debate over product definition, and different systems of classification have distinguished products according to a variety of characteristics: the source of their raw material (dairy fat, animal fat, and vegetable fat); their total fat content; their polyunsaturated fat content; and whether they are hard or soft (Traill et al., 1994). For example, a market research agency used the following definitions: butter (80 percent and over dairy fat); margarine (80 percent and over nondairy fat); dairy spreads (usually a 75 percent fat blend of dairy and non-dairy fats); low-fat spreads (25 to 40 percent fat); and reduced–fat spreads (60 to 80 percent).

Butter is sold in rural markets and at the central market in Addis Ababa. In rural markets butter is sold by volume, the weight of which can vary considerably. In Addis Ababa market butter is sold by weight. The retail price in Addis Ababa market for butter is fluctuate depending on its quality and on market demand, which is high during feasts but low during fasting periods. Traders purchase butter from farmers for resale in urban and rural market. They buy butter of better shelf life at farm gate or at market place. No premium is paid for any fat remaining in the main byproduct of butter making the local cottage cheese called ayib (FAO, 2005). Only about 5.5% of butter reaches the final consumer through itinerate butter traders. Price is used as a sign of quality, at the retail market in Addis Ababa butter is standardized on the basis of quality. Implicitly expensive butter is assumed to be of better quality, while cheaper ones are inferior. Sometimes quality is compromised and tradeoffs are commonly observed between quality and price and for obvious reasons good quality butter fetches higher price (Gizachew, 2005 and Embaye, 2010).

2.1.4 Constraints of dairy market in Ethiopia

According to (AGP, 2013) many middle and low-income consumers interviewed stated that price of milk is very high, and that they are finding it increasingly difficult to purchase milk and milk products. About 92% of the cafeterias/hotels and 91% of consumers interviewed cited very high price of dairy products because due to insufficient milk supplier. Raw milk purchased in urban areas costs 13-15 ETB/li. 24 Pasteurized milk can cost more than 18 per liter, which is unaffordable for most households.

On other side fluctuations in the demand for milk and other dairy products, because of the various fasting periods, during which Orthodox Christians (comprising 43.5% of the population, 59.1% in Addis Ababa) who are observant will abstain from consuming all kinds of animal products. Demand drops during the long fasting seasons of Kudade (55 days, usually in March/April) and Filseta (16 days, in August). Wednesdays and Fridays of every week are also fasting days. There about 200 fasting days in a year. Producers report a 50% drop in their milk sales during the major fasting periods. During these periods they process milk into butter and cheese, which have longer shelf lives and can be sold after the fasting period. Both milk and other products are sold at significantly lower prices during this period (Redda, 2001).

In the highlands milk is traditionally considered to be a food item which is essential only for babies and convalescent persons. Its nutritional benefits for adults tend to be overlooked. As a result, the value attached to milk's consumption is limited. Most milk is marketed informally. Estimates suggest that 90% of the milk supplied to the Addis Ababa market and 95% to the national market passes through informal marketing channels – all unprocessed.

As well as this to enhancing the ability of poor smallholder farmers to reach markets and actively engage, poses a pressing development challenge (Mohamed et al 2004). Difficult market access restricts opportunities for income generation. Remoteness results in reduced farm-gate prices increased input costs and lower returns to labor and capital. This, in turn, reduces incentives to participate in economic transactions and results in subsistent rather than market-oriented production systems. Sparsely populated rural areas, remoteness from towns and high transport

costs all pose physical barriers impeding market access. Transaction costs such as lack of information about markets, lack of negotiating skills, and lack of collective organization are other impediments to market access. The question of how to expand the market participation of smallholder livestock producers is a major challenge facing many governments and NGOs in developing countries.

2.2 Empirical Literature

2.2.1. Factors Affecting Market Supply

A number of studies were done to determine factors that affect market supply of different agricultural commodities. Some of these studies considered two dependent variables which are market participation decision and marketed volume are stated by Gizachew (2005), Woldemichal (2008), Abdi (2010),Embaye (2010), Berhanu (2012, 2014), Nigussie (2014).Those are adopted Hickman two steps model to estimate the probability of farmers' participation in market and market supply level.

Similarly, Gizachew (2005) analyzed factors affecting dairy household milk market entry decision using heckman two stage model and marketed milk surplus using probit model in Ada'haLiben district in Oromiya region by using data from 61 sampled dairy households. His study revealed that education level of the dairy household head, extension visits and income from non-dairy sources had positive relationship with household milk market entry decision. Gizachew (2005) also found that dairy cow breed, loan, income and extension visit, education level of spouse and distance from milk market were related to marketed surplus positively; however, distance from district and education level of the household head were related negatively with marketed milk supply. Nevertheless, the study did not consider the contribution of dairy household access to milk market information, dairy production credit source and the separate contribution of modern and traditional production techniques to market participation and marketed milk surplus. Moreover, the study considered the dairy cow breed variable as dummy which is very difficult to see the marginal contribution of local and cross breed dairy cows.

According to Woldemichael (2008), on dairy marketing chain in Shashemena, Hawassa and Dale district milk shade using the first step Heckman two stages procedures results showed that dairy household milk market entry decision was strongly and significantly affected by age of the household head, family size, education level, experience in dairy production, number of cross breed milking cows owned and distance from milk market center. In addition, the second stage estimation result revealed that marketable milk volume was found to be strongly and significantly affected by the number of cross breed milking cows owned, family size, age squared and annual non-dairy income source of sampled dairy household.

Accordingly,Abdi (2010) Determinants of participation in milk marketing of smallholders in JijigaWoreda, study. The coefficient of correlation showed that out of the demographic variables, only family size and education of the household heads were negatively correlated with participation in milk marketing and significant at 0.05 and 0.01 levels respectively; while the other two variables such as age and sex were not statistically significant but have negative and positive relationship with participation in milk marketing respectively.

According to Berhanu (2012) study on market access and value chain analysis of dairy industry in WolaitaThe first-stage probit model results indicate that milk yield in liter per day, distance from urban centers, age, child, poor access to livestock extension services, shelf life, social factors (holidays and fasting), and labor availability determined household‟s decision to add values to milk. Heckman second stage results show that most of the factors determining decision of participation in milk value addition also determined the level of participation. The probit model results indicate that household size, presence of a child, landholding size, distance from urban center and milk yield per day played a significant role in the probability of milk sales decision.

According to Berhanu (2014), factors affecting milk market participation and volume of supply in Ethiopia in welayta zone study. The probit model result indicated that age of household head dairy farming experience, milk yield per day milking cow ownership and landholding size played a significant role in milk market participation. Second –stage Heckman selection estimation pointed out that milk yield per day, dairy farming experience and a number of in household positively and significant affected the probability of milk market participation .dairy farming

experience of a household negatively and significantly affected milk market participation and volume of supply. Thenumber of milking cows owned by a household positively and significantly affected probability of milk market participation .milk yield per day impacted positively and significantly milk market participation and volume of supply.

3. RESEARCH METHODOLOGY

3.1. Description of the study area

Gondar is one of the three metropolitan cities in Amhara National Regional State, which is found at North Gondar surrounded by Lay-Armacheho, Dembya and Gondar Zurya woredas. The city is located at 120º 401º ° North latitude and 370º to 451º east. The climate has an average annual temperature of 19-20 degree Celsius and average annual rain fall amount 1800mm. The elevation varies from 2000-2220m above sea level. Gondar is situated at 748 km from Addis Ababa and 182 km from Bahirdar. According to Gondar town Communication Office (2016) Gondar is the former capital city of Ethiopia was bring into being in 1635 during Emperor Fasil Regime. It was the home of Fasil castle recognized world heritages and it has the long history place in the country.

3.1.1. Socio-economic features of the study area

According to the new administrative arrangement, the city is to be administrated by a mayor council system, in which municipal aspects are managed by a city manager. The city administration is comprised with 12 kifele-ketema and 10 rural kebeles as well as one satellite town (Teda). According to CSA (2015) the total area of Gonder city is 53 square Km. the total population is 313,910 from this 148,077 (47.17%) are males and 165,833 (52.8%) are females. In urban total population is 264,931from this male 123,186 and female 141,745 where as in rural total population 48,979 from this male 24,891 and female 24,088 GAOF (2015).

The city served with an international airport, digital telephone communication, 24 hours hydro-electric power and have an inter- urban road which covers a distance of 41 kilometer asphalt and 65 kilometer gravel road. The city has also conducive land transportation access to the south with Addis Ababa, west with Sudan, north with Axum, and northwest with Humera. Gondar town has 34 governmental and 10 private primary schools, 4 secondary and 2 preparatory public schools. Also it has 19 kindergartens, one university and a number of privately owned colleges. The town delivers health service with one public hospital, 4 health station, and 45 clinics to the residents of

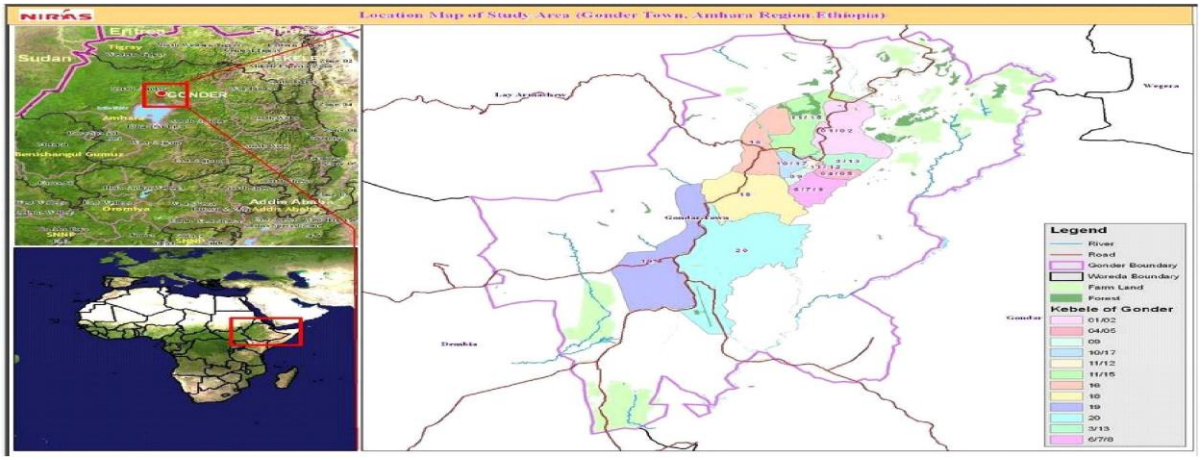
the city and the surrounding community. In the city there are 4 public and 15 private banks, one public and 10 private insurance company and also different agro business industries and hotel service. It has also 4 dairy cooperative and 1 union of dairy cooperative with milk plant processing.

The total area of cultivated is 11699 ha. Average land holding is 1.2 ha. The total area of urban and rural is 4700 and rural 29718.84, respectively. Farming systems of in the study area was characterized by crop production, livestock production, and mixed farming systems and off-farm. Crop production is carried out in both seasons although Major crops grow teff, maize, wheat, barley and vegetables are the annual crops grown. In generally agricultural product are the most important marketable commodities.

According to data from AOF (2015) Cattle are kept for milk production, draft power and cash income. The population is cattle 32,997, sheep 11,437, 4,197goats, 106 swine, 6,693donkey, 29962 poultry and 4,333 bee productions are practiced in the study area. The animal population is Cattle Sheep, Goats, equines Poultry and Bee Hives, whereas number of milking cows in the study area 1390. The

There are small dairy cooperatives in Gondar Sabya sayina, Anchew,Defecha and Gonder city which supply of milk in the mornings to Jantekel and Fassil dairy union in Gonder town). These cooperatives supply milk in the morning. This cooperative had an office and was equipped with some own dairy processing equipment. Almost all men and woman dairy farmers are selling milk; hence culture will not be a problem. Jantekel dairy union was established with the support of Integrated Livestock Development Project to collect and process milk from dairy cooperatives in pere-Gondar area and Lay Armachoho. The processing plant had a capacity of 1500 l/day when it was established.

Figure 1 : Location Map of Gondar city



Location map of the study area

Source: Gondar city administration industry and land management office

3.2.Methods of data collection

For the purpose of this study there are two approaches used namely rapid market appraisal and, for baseline information and formal survey with semi-structure interview schedule were used to generate quantitative and qualitative data for the study.

To collect primary data formal and informal surveys were employed and informal survey was conduct for collection of secondary data. Rapid Market Appraisals (RMA) techniques were also employed to have overview on milk production in the area. Rapid market appraisal techniques considered a number of stakeholders, who were believed to provide general information about the area. Formal survey was employed through interviewing the sample milk producer households and traders using the semi structure interview schedule. The questionnaire was pre tested before starting the actual data collection and then modified accordingly. Field trips were made before the actual survey to observe the overall features of the study area and pre-tested the interview schedule with 20 household heads. Enumerators were employed from the Woreda agricultural office experts and development agents who have experiences, knowledge of

the languages and culture of the community on the content of the interview schedule and basic techniques of interviewing. The survey was conducted between November to December, 2016, and the data were collected under the close supervision of the researcher.

3.2.1. Source and Data Requirements

For this study both primary and secondary data sources were used. The primary data was collected from producer and traders. The primary data were collected using two types of interview schedule: one for dairy producer focusing to identify factors affecting milk market supply and dairy household milk market participation; the other for milk and butter traders focusing to identify major marketing channels, marketing margins and marketing constraints of the study area. Data collected from the dairy household include size of milk output, access to market, extension service, credit and market information, annual income from non-dairy sources and the demographic characteristics of the dairy household.

Further, the primary data collected from milk and butter traders include demographic characteristics of trader, trading activities and marketing costs, purchase and sale price, marketing channel arrangements, volume and direction of trade, buying and selling strategies, the role of milk and butter marketing actors and other relevant information were collected from butter market place, butter selling and fluid milk selling premises. The study also employed information from secondary sources such as Central Statistical Authority (CSA) and Woreda and zonal Agriculture and rural development offices regarding dairy production and marketing. Pre-tested questionnaires and checklist were also used to guide the informal discussion designed to probe inquiry and helps to make the interviews more consistent.

3.3. Sampling Techniques

Sample selected on the basis of milk production potential and the presence of various dairy marketing actors that contributes to value addition of the dairy commodities in the area. The

study use, a multistage sampling technique was employed. The samples covered milk producer based on probability proportional to size sampling technique.

Producers sampling: In the selection process Woreda Agricultural Office experts were consulted. In the first stage, Gondar city as part of the Gondar zone of Amhara region has a total of 12 sub city (Kifel-Ketema) and 11 rural Kebeles, out of this 3 rural Kebel and 3 sub city where purposively selected based on the extent of milk production and accessibility. In the second stage, those farmers who have lactating cow were listed and identified in consultation with the key informants and Kebele leaders.

The sampling frame of the study was using the list of households of samples Kebele, 204 sample households were selected proportional to the population size of the selected Kebeles. Then the pre-determined size of sample farmers from each Kebeles were randomly selected using systematic random sampling techniques.

Table 1: total population and total sample respondent

	Pre-urban			Urban		
	Name of Kebele	population	sample size	Name of sub city	population	sample size
1	Anchew	292	43	St. gebral	310	45
2	Sabiya	270	38	Marak	216	31
3	Defecha	160	25	Arbegnoch	142	20
	Total	722	106		668	98

Sources: Survey result from milk producer list, 2017

The determination of sample size was resolved by means of Slovene's sampling formula with 93 percent confidence level (Yamane, 1970). After obtain the sample size were using proportional allocation.

$$n = \frac{N}{1 + Ne^2} \qquad (1)$$

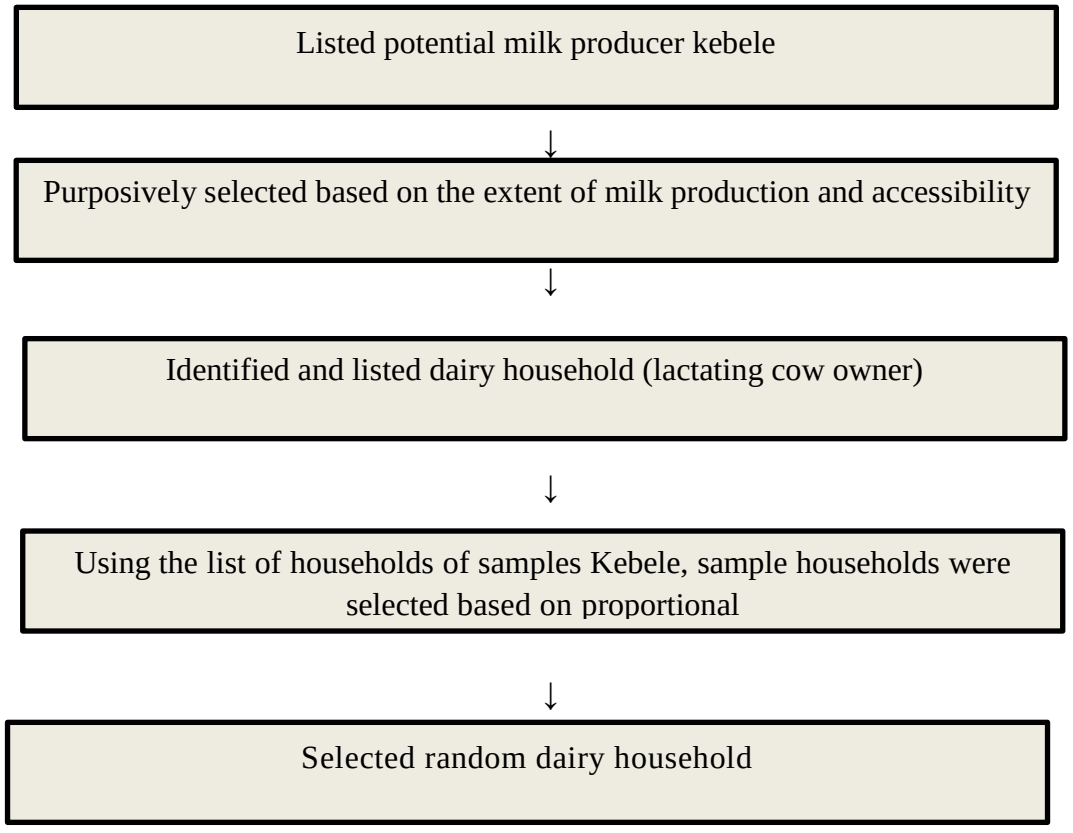
Where:

- **n**= sample size for the research use
- **N**= the total dairy farm owners in the city
- **e** = margin of errors at 7% (the level of precision that assume e= 0.07.

So to obtain the sample size for this study was calculated based on the above formula. The total population is 1390 whereas the total sample size is 204 dairy household.

N = $\frac{1390}{1+1390(0.07)^2}$ == 204

Sampling step



Traders sampling: Trader's survey was conducted in town markets, which are connected with the regional state. The town markets purposively selected for trader's surveys were in market place and shops which were selected based on the flow of milk and butter produced in the study city. At first in order to have a possible level of representative trader's secondary Woreda information was collected and discussions were conducted with traders' cooperatives. By consulting traders, information was gathered and a size of traders was determined by developing a sample frame. Hence, 12 milk trader and 12 butter sample traders were selected. Out of 24 traders interviewed traders an independent semi structured interview schedule has been prepared and used. From these, 12 milk trader and 12 butter sample traders were selected from Gondar city market.

3.4. Method of Data analysis

Descriptive statistics and econometric analysis were used to analyze the data collected from milk producers and milk and butter traders.

3.4.1 Descriptive statistics

This method of data analysis refers to the use of ratios, percentages, means, minimum, maximum and standard deviations were used to explain the basic characteristic or comparing socio-economic and institutional characteristics of the dairy producer and traders.

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3.4.1.1 Market Structure, Conduct and Performance Analysis (S-C-P)

Since the 1960s, the systematic nature of markets has increasingly been emphasized in defining means of analyzing their efficiency. The S-C-P approach or industrial organization school is then developed. The approach has been used in the study of markets in many countries such as in India by Level and Harris and in West Africa by Jones among others (Magrath, 2000). The S-CP approach focuses on the behavior of groups rather than individual firms, and looks into the influence of the horizontal relationships among these firms on market performance. Thus, it is

suggested that the S-C-P model is preferable to that model which analyzes the productive efficiency of individual marketing enterprises.

Concentration ratio

It is one of the commonly used measure of market structure, which refers to the number, and relative size of buyers in the market. The concentrations of firms in the market were being estimated using the common measure of market concentration ratio.

$$C = \sum_{i=1}^{n} S_{i \ldots} \ldots\ldots\ldots\

Marketing Margins

A marketing margin is the percentage of the final weighted averages selling price taken by each stage of the market chain. The total market margin in the difference between what the consumer plays and what the producer receives for his milk or butter. In other word it is the difference between retail price and farm price (Cramers and Jensen, 1982). Computing the total gross marketing margin (TGMM) is always related to the final price paid by the end buyer and is expressed as percentage. It is useful to introduce the idea of ‘‘producer’s gross margin’ (GMMp) which is the portion of the price paid by the consumer that goes to the producer. The producer’s margin is calculated.

TGMM= End buyer- First seller price*100

End buyer price

TGMM= total gross marketing margin

3.5. Econometric model

Econometric model was used to identify the factors that affect producer ’ participation decision in the supply of dairy to the market in one hand and determinants of the volume of dairy supplied to the market in the other hand. Most literatures adopt “probit and Heckman’s two stage models’ to identify factors that affect producers to participate in the supply of milk or not and also identify the limiting factors that determine the level of dairy (milk) supplied to market.

If a data set that is used for a regression suffers from selectivity bias, then the regression analysis is used Mills ratio. Ideally, the OLS model is applicable when all households participate in the market. In reality not all households participate in a specific commodity market. Some households may not prefer to participate in a particular market in favor of another, while others may be excluded by market conditions. If the OLS regression is estimated excluding the nonparticipants from the analysis, a sample selectivity bias is introduced into a model. Such a problem can be overcome by following a two-step procedure as suggested by Heckman (1979).

Probit model can also be used to address the above mentioned problem; but its assumption that both the participation decision and level of supply determined by the same variable in the same way introduces inconsistency bias into the model. But in reality all producers may not be potential suppliers of a product and a variable that affect participation decision may or may not have similar effect on the volume of a produce supplied to the market.

Heckman's has developed a two-step estimation procedures model that corrects for sample selectivity bias. If two decisions are involved, such as participation and volume of supply, Heckman (1979) two step estimation procedures are appropriate. The first stage of the Heckman two-stage model is a 'participation equation', attempts to capture factors affecting participation decision. This equation is used to construct a selectivity term known as the 'inverse Mills ratio' (which is added to the second stage 'outcome' equation' that explains factors affecting volume of milk supply. The inverse Mill's ratio is a variable for controlling bias due to sample selection (Heckman, 1979). The second stage involves including the Mills ratio to the milk supply equation and estimating the equation using Ordinary Least Square (OLS). If the coefficient of the 'selectivity' term is significant then the hypothesis that an unobserved selection process governs the participation equation is confirmed. Moreover, with the inclusion of extra term, the coefficient in the second stage 'selectivity corrected' equation is unbiased.

Specification of the Heckman two-step procedure, which is written in terms of the probability of milk market participation, **MMP**, and marketed milk volume, **MMV**

(A)The participation equation/the binary probit

$$Y_{1i} = \beta_{1i} X_{1i} + \alpha\lambda_i + u_i$$

Where: **Y1**i: is the latent dependent variable, which is not observed.

- **X1**i: are vectors that are assumed to affect the probability of the sampled household's milk market participation.
- **β1**: is a vector of unknown parameter in participation equation.
- **U1**: are residuals that are independently and normally distributed with zero mean and constant variance.

MMP: milk market participation, **MMV**: volume of milk marketed.

(B)The observation equation

$$Y_{2i} = \beta_{2i} X_i + \alpha\lambda_i + u_i$$

$$Y_i = \beta_1 somo + \beta_2 aofge + \beta_3 shh + \beta_4 fs + \beta_5 elhh + \beta_6 ef + \beta_7 dfm$$
$$+ \beta_8 mp + \beta_9 tlse + \beta_{10} atmi + \beta_{11} credt + \beta_{12} nomc + \beta_{13} fifnd + \beta_{14} eidp + ... + \lambda_i \mu + u_i$$

Where **Y2i:** is observed if and only if **MMP=1.**

- The variance of **X2i** is normalized to one because only **MMP**, not **Y1** is observed.
- The error terms, **U1** and **U2,** are assumed to be bivariat and normally distributed. **Y2i:** is regressed on the explanatory variables, X2i and the vector of inverse ƐMills ratios λi from the selection equation by ordinary least squares (OLS).
- Where: **Y2i:** is the observed dependent variable, which is volume of milk marketed.
- **X2i**: is factors assumed to affect the volume of milk marketed. **β2:** is vector of unknown parameter in the volume of milk marketed equation.
- **U2i**: is residuals in the observation equation that are independently and normally distrusted with zero mean and variance δ2

Where: **f (Xβ)** is density function and **1-F (X1 B1)** is distribution function. Even if Heckman's two-step procedure is widely used, it has problems like, the estimators cannot be calculated if **X1i** contains all variables that belong to **x2i** and the estimator is not efficient even if it can be calculated.

The absolute values of the t-values of the simultaneous maximum likelihood (ML) estimators were generally larger than those obtained by Heckman's two-step estimator. The reason for this finding is that the simultaneous ML estimator is asymptotically efficient, suggesting usefulness of the simultaneous ML estimators (Nawata, 1993). Therefore it is reasonable to use the Heckman's ML estimators to estimate the model. Basically, it discriminates the selection models from the mixture-distribution models where the distribution of u1i; i = 1… N is defined only for a sub-population of the sample (participants). Under the assumption, the parameters of the model can be estimated by Maximum Likelihood method.

Econometric Software known as "LIMDEP" will be employed (Gujartia, 2004) to run the model (Heckman two-stage selection). Before fitting important variables in the models, it is necessary to test multicolinearity problem among the variables which seriously affects the parameter estimates.Several methods of detecting the problem of multicollinearity have been used in various studies. Two measures are often suggested in the discussion of multicollinearity are the variance –inflation (VIF) factor and the condition number. VIF is defined as:

$$\text{VIF}(\hat{\beta}_j) = \frac{1}{1 - R^2_j} \qquad (9)$$

We can interpret VIF (βjˆ) as the ratio of the actual variance of βjˆ to what the variance of βjˆ would have been if Xi were to be uncorrelated with the remaining X's, it compares the actual situation with the ideal situation. The conditional number is supposed to measure the sensitivity of the regression estimates to small change in the data.

Similarly, the Contingency Coefficient is employed as one of the means to check for association among discrete variables. It is a measure of association from cross-classification data and is computed as:

$$C = \sqrt{\frac{\chi^2}{n + \chi^2}} \qquad (10)$$

Where, $\chi 2 = \frac{(0-E)}{E}$ and n= total sample size.

The contingency coefficient is relatively easy to compute and satisfies the condition that it equals 0 when there is no association between the variables. However, it does have some disadvantages as a measure of association. For detecting both multicollinarity tests for continuous and dummy variables, Statistical package SPSS version 12 will be used to compute both VIF and CC.

Before fitting the models, it is necessary to test multicollinearity problem among the variables. Several methods of detecting the problem of multicollinearity have been used in various studies.

The Variance Inflation Factors (VIF) technique was employed to detect the problem of multicollinarity among the continuous variables (Gujartia, 2004).VIF can be defined as:

$$VIF(\hat{\beta}j) = (1-R^2)^{-1}$$

Where, R_i^2 is squared multiple correlation between X_i and other explanatory variables. The larger the value of VIF, the more troublesome the problem of multicolinarityis .As a rule of thumb, if the values of VIF is greater than 10, the variables is said to be highly collinear Similarly, the Contingency Coefficient (CC) was employed as one of the means to check for association among discrete variables. CC is a measure of association and is computed as=χχ Where, CC is contingency coefficient, χ2 is the chi square value and N is total sample size. If the value of contingency coefficient is greater than 0.75 the variables are said to be collinear.

3.3.4. Hypothesis and variables definition

This part of the study tries to hypothesize factors that influence both milk market participation decision and level of milk supplied to the market. In the course of identifying factors influencing milk supply, the main task is to explore which factors potentially influence and how these factors related with the dependent variables. Therefore, potential variables, which are supposed to influence milk market participation and intensity of volume of milk were explained. Thus the list of variables expected to have influence on both the producer' participation decision and volume of quantity supplied to markets was defined.

Dependent variable

Milk Market Participation decision (MMPD):: This is dummy variable representing the participation decision on whether, to supply milk to the market or not and this variable is the dependent variable that was regressed in the first step of the Heckman two stages estimation procedures (probit) for the respondents who participated in milk market in the year of 2016/17. For the household who participate in milk market the variable takes the value of one where as it take the value of zero for the households who did not participate in the milk market.

Marketed Milk Volume (MMV): It is continuous variable in the second step of the Heckman's selection equation that represents volume of milk supplied to market. It is measured in liters and represents the actual sales of milk by producer households' in 2016/2017 production year, which takes positive values.

Independent variables

Different variables are expected to determine a farmer's decision to participate in the market and supply a certain volume of output. According to Gizachew (2005), Woldemichal (2008), Berhanu (2012, 2014), Nigussie (2014) of the studies revealed that farmer's decision to participate in a market could be determined by a number of socio-economic and demographic factors.

Quantity of milk output (SOMO): It is continuous variable measured in litters. The variable is expected to have a positive contribution to milk producer market participation decision and level of milk market participation. A marginal increase in dairy production has obvious and significant effect in motivating market participation. Production beyond consumption has two fates based on various reasons; either sold as fluid milk or processed into different dairy derivatives. The processed part of the product may be used for home consumption or sales. Production in turn varies directly with the number of lactating dairy cows. As the number of dairy cow increases, production also increases and the percentage share of consumption declines and sales increases (Holloway *et al.,* 2002: cited by, Ayelech 2010). Study conducted by (Singh and Rai, 1998: cited by, Woldemical, 2008) identified factors affecting marketed surplus of buffalo milk in Haryana. Thus, size of milk output variable is assumed to have positive relation with dairy household milk market entry decision and level of milk market participation.

Age of the household head (AOHH): Age is continuous variable and measured in years. The expected influence of age were assumed positive taking the presumption that as farmers' gets older they could acquire skills and hence produce much and developed skills to participate to a market. (Tshiunza, 2001: cited by, Ayelech 2010). Identified age as the major farms' characteristics that significantly affected the proportion of cooking banana planted for market.

He found that younger farmers tended to produce and sale more cooking banana than older farmers did

Sex of the household head (SHH): This is a dummy variable. No sign could be expected a priori for this variable. It could take positive or negative signs. A study by (Makhura, 2001: cited by, Berhanu, 2014) on the households' participation process in milk markets indicated that women are more inclined to sell their livestock than men. On the other a study on gender difference and the marketing styles at small ruminant producers showed that men tend to sell ruminants more frequently than women (men trade more than women) and women tend store longer and receive less than men.

Family size (FS): This is the total number of family members that can be taken as a proxy for the level of consumption. This continuous variable is expected to influence participation decision and supply negatively. Study by (Chauhan and Singh, 2002: cited by Ayelech, 2014) in India, indicated that the marketed surplus is negatively related with the size of family and level of consumption.

Education level of the household head (ELHH): This variable hypothesized to affect marketable supply positively. It has dummy values. Education plays an important role in the adoption of innovations/new technologies. Further, education is believed to improve the readiness of the household to accept new idea and innovations, and get updated demand and supply price information which in turn enhances producers' willingness to produce more and increase milk market entry decision and volume of sale. Study conducted by (Holloway *et al*. 1999: cited by, Birhanu, 2012) indicated positive relationship between education and dairy household milk entry decision and marketed milk volume. Similarly, study conducted by Gizachew (2005) and Rehima (2006) showed that formal education was positively related to household market participation and marketed volume. Therefore, in this specific study, formal education is hypothesized to affect milk market participation decision and sale volume of milk positively.

Access to Extension (AE): This is a dummy variable indicating the extension service farmers were getting. These variables were expected to influence participation and supply positively.

Obviously, as farmers learned more and knew much it were obvious that they would milk much and ultimately participated in a market. In this line, study conducted by Rehima (2006) identified that extension visit was directly related to dairy household milk market entry decision and marketed milk volume. Furthermore, identified that extension visit was positively related to pepper market entry decision and marketed pepper volume. Therefore number of extension visits is hypothesized to impact dairy household milk market entry decision and marketed volume of milk positively.

Distance from market (DFM): This is a variable used to measure access to markets measured in travel hours for a fee single trip. It is a continuous variable and expected to influence participation and supply positively. Again (Makhura, 2001: cited by, Berhanu, 2014)) explained that those households located closer to market centers were experience lower costs since they can get information more easily. The study by (Sirak *et al.* 2007: cited by, Woldemical, 2008) on the analysis of cattle marketing participation in South Africa shows that distance to the preferred market channel is negatively related with the probability of selling. He also found that the likelihood of sales at the market increases significantly (positive) with an improvement with market facilities and a decrease in travel time from the village to the market.

Market price (MP): This variable is measured in Birr per size of the milk. (Tomek and Robinson, 1985; cited, Ayelech 2014) argued that the product price has direct relations with marketable supply and hence it was expected to affect the household marketable supply of milk positively. But they argued that in the short run prices could not stimulate market supply due to the biological nature and time lag requirement of production.

Total land size (TLSE): The total size of farm land owned by a farmer is among the variables that could influence both participation and supply. If a farmer owns more land, the probabilities of allocating land for production of milk production were increase. It is a continuous variable expected to influence participation and supply decision in similar direction. The study of Birhanu (2013) the coefficients on available land area are highly significant for both the linear (positive) and quadratic (negative) terms, indicating a diminishing marginal effect on milk market participation as land area increases over the whole range of the data. On another study also land

holding has an indirect positive effect on market participation, though it is positive effect on farm output.

Access to market information (ATMI): This is a dummy variable taking a value of 1 if the farmer had access to market information and 0 otherwise. It is hypothesized to affect milk marketable supply of the farm households positively. Because, producers that have access to market information are likely to supply more milk to the market. Obtaining information through extension contacts increased the chance of household selling milk. Study by (Makhura 2001: cited by, Berhanu, 2014) implies that getting information through extension contacts has a considerable marginal effect on increasing the probability of selling dairy products.

Credit Access (CREDITAC): This is a dummy variable, which credit indicates taken for milk production. Access to credit will enhance the financial capacity of the farmer to purchase the necessary inputs. Therefore, it is hypothesized that access to credit will have positive influence on market participation and volume of sale. Study by Mendoza 1995) survey showed credit users showing better production and market participation among cooperative members. Accesses to credit were enhancing the financial capacity of the farmer to purchase the bird. Therefore, it is hypothesized that access to credit would have positive influence on level of production and sales.

Number of milking cows (NOMC--CB for cross breed, LB for local breed): This variable is continuous and is measured in number of milking cow owned. This variable will expect to influence positively ether to participate or supply as increase the number of milking cows owned. The study by Berhanu et.al.(2013) Factors affecting milk market outlet choices in Wolaita zone the high lands on expanding market participation among smallholder livestock producers indicated positive and significant relation between milking cow numbers and market participation and marketable milk volume.

Financial income from the non-dairy sources (FIFNDS): It is continuous variable measured in Ethiopian Birr (ETB). This variable will expect to influence positively affect milk market entry decision by household and sale volume of milk. Through improving liquidity, this income makes the household more able to expand production and/or purchase from market. It also strengthens the household position in coping with different forms of risks and enters into economic transactions.

Experience in dairy production (EIDP): it is a continuous variable measured in terms of the number of years of dairying of the household head. It is a continuous variable which was measured in terms of the number of years a household practiced milk production and marketing. It was expected to have positive effect on market participation and sales volume. As milk producer got more experience of keeping cow there will be increased probability of more milk production and increased supply of milk to market. Moreover, farmers with longer experience have a cumulative knowledge of the entire farming environment. This is turn enables them to produce more marketable milking than farmers started keeping recently.

Table 2: Description of the dependent and independent variables used in the model

Variables	Description	Types	Values
MMPD	Milk market participation	Dummy	1=yes,0= no
MMV	Marketed Milk Volume	Continuous	Litter
AOHH	Age of the household head	Continuous	Number of years
SOMO	Size of milk output (produced)	Continuous	Litter
FS	Family size	Continuous	Man equivalent
ELHH	Education level household head	Dummy	0=Illiterate,1=read
EIDP	Experience in dairy production	Continuous	Number of years
DFM	Distance from market	Continuous	Kilometer
NOMC	Number of milking cows	Continuous	Number of milking cow
MP	Market price	Continuous	Birr
AES	Access to Extension service	Dummy	0=not visited, 1= visited
FIFNDS	In-come from non-dairy sources	Continuous	Birr
SHH	Sex of the household head	Dummy	0=female, 1=male
CREDITAC	Credit Access	Dummy	0=no,1= Yes
ATMI	Access to market information	Dummy	0=no,1= Yes
FA	Feed access	Dummy	0=no,1= yes

4. RESULTS AND DISCUSSION

This chapter presents the major results of descriptive and econometric analysis of the study. The descriptive analyses were used to describe the general socio-economic characteristics in relation to market participation and marketed surplus of small scale milk producer, milk and butter trader, marketing channels, structure, conduct and performance of milk and butter marketing and also the main constraint and opportunity of milk production and marketing. Following these, the results of econometric analysis employed to identify factors that affect household market participation decision and marketed supply of milk in the study area.

4.1 Descriptive Results

4.1.1. Demographic and socio-economic characteristics of small scale milk producers in relation to market participation

Table 3 and 4 presents demographic and socio-economic characteristics of the sample respondents. The total sample size of the farm respondents handled during the survey was 204. Among the total sample respondents, 71.56 % were male headed households and 28.43% were female headed households. In terms of market participation, 53.9 % of market participant were male headed, while 15.68 % were female headed. On the other hand, 17.64% of non-market participants were male headed households, while 12.74% of non-market participants were female headed households. This indicates majorities of sample respondents were male headed households in the study area. This implies that the participation of women/females/ in dairy cow ownership was very low; this might be related with unequal distribution of resources.

The survey on the age of sample household, measured in years, provided a clue on working age of households. The result in Table 4 showed that the youngest market participant was 29 years old and the oldest was 71 years old. On the other hand, the youngest non-market participate was 30 and the oldest non-market participate was 70 years old. Average household heads age for

market participants was 53 years, while for non-market participants were 50.57 years. In terms of family size, the smallest family size among market participants was 1 member while the highest were 12 members. Among non-market participants, the smallest family size was 3 members while the highest was 11 members. The average family size for market participants were 5.87 while for non-market participants 5.63. In terms of land size, the smallest land sizes owned by market participant and non-market participants were 0.1 hectare while market participant and non-market participants has the largest land sizes were 2 hectares while 0.77 hectare on average land holding for milk market participant, where as non-market participant average land holding where 0.39 hectare.

In terms of milk yield per day (size of milk output), the smallest amount produced by market participant on daily basis was 2.85 litter while the highest amount was 144 litter. Among non-market participants, the smallest amount produces on a daily basis was 1 litter while the highest amount was 12 litters. Average milk yield per day for market participants was 21.4 litters, while for non-market participants were 2.85.

Age of households

Table 4 indicates that the average age of market participants was 53.07 years while that of non-market participants 50.57 years. The overall mean age of milk producer was 52.41 years old. The result of t-test shows that age was statistically significance at 10% significance level. That means the mean ages by market participants are greater than that of non-market participants. Therefore, age is the single most important factor of production and a measure of experience in the study area.

Family Size

In terms of family size, the result indicates that the average family size of market participants were 5.87 members, while for non-market participants 5.63 members. The overall mean was 5.8 members. The result of t-test showed that family size is statistically insignificant meaning that family size between market participants and non-market participants were almost similar.

Experience in milk production

In terms of experience in milk production, the result indicates that the average experienced in milk production by market participants was 20.33 year, while that of non-market participants was 18.26 year. The overall mean experience of milk producer 19.77. The result of t-test indicates that experience is statistically insignificant meaning that the experience of milk producer between market participants and non-market participants has not influence.

Number of milking cows

In terms of milking cows, the result indicates that the mean of milking cow by market participants was 2.81 numbers, while that for non-market participants was 1.44 numbers. The overall mean of calves owned by the sample household farmers were 2.45 numbers. The result of t-test shows that number of milking cow was statistically significant at 1% significance level. This indicates that market participant more numbers of milking cow than non-market participant milking cow. Therefor as the number of milking cow increases the milk is yield increase. This implies that increasing the milk participant than non-participant milk production.

Milk Yield (quantity of milk output)

Dairy producer sell the amount of milk produced in the market depending on different demographic and socio-economic characteristics of the household. The survey result showed that the total milk produced in this area 3,363 liters per day, out of this supplies to market 2,980 (88.58 %) litter per day the remain milk used for household consumption. The average amount of milk produce in the household is 16.49 litters, out of this average milk supply to market 14.60 liters per day per house hold. In terms of milk yield, the result indicates that the mean of milk yield per day produced by market participants per day was 21.4 litters while that for non-market participants was 2.85 litters. The overall mean of milk yield per day was 16.49 litters. Moreover, average milking per cow per day from zebu cattle 1.8 litters while cross breed 12 litter. The result of t-test shows that milk yield was statistically significant at 1% significance level. This indicates that the market participants had more milk yield than non-market participants. The

result is consistent with the findings of Woldemicahel (2008) who confirmed that increasing the volume of production increases market participation.

Table 3: Demographic and Socio-economic characteristics of sample respondents (continuous variables)

Variable	Non milk market participation		Market participation		Total mean	t.test	Sig.
	Mean	Stan.dev	Mean	Stand.dev			
Age	50.57	8.895	5.87	1.83	52.41	-1.765	0.0789*
Family S	5.63	1.784	20.33	8.14	5.8	-0.822	0.41
Education	18.26	8.649	2.81	1.35	19.77	-1.57	0.12
Number of cow	1.44	0.604	21.4	22.15	2.44	-7.13	0.000***
Quantity	2.85	2.227	12.24	1.83	16.49	-6.13	0.000***
Milk price	12.24	1.513	2102.3	1163.70	12.24	-0.088	0.93
Income	2539.81	1068.83	2.54	1.965	2218.4	2.42	0.0165**
Distances	3.13	1.97	0.77	0.53	2.667	1.63	0.104
Land	0.39	0.349	53.07	8.92	0.671	-4.740	0.000***

Note: ***, ** and * are statically significant at 1%, 5% and 10% significance level respectively

Source: Survey data (2017)

Total land size

In terms of land size, the result indicates that the average land size owned by market participants was 0.77 hectares, while that of non-market participants was 0.39 hectares. The overall mean of land size owned by sample producer was 0.67 hectares. The result of t-test indicates that land size is statistically significance at 1% significance level. This means that the mean land sizes owned by market participants are greater than that of non-market participants. Therefore, land is the single most important factor of milk production and a measure of wealth in the study area.

Financial income from non-dairy source

In terms of income from non-dairy source, the result indicates that the mean income of milk household by market participants was 2102.32 birr, while that for non-market participants was 2539.81 birr. The overall mean of income from non-dairy source by the sample household were 2218.38 birr. The result of t-test shows that number of milking cow was statistically significant at 1% significance level. This indicates that non market participant more generate none dairy source income than milk market participant. Therefore it influence on milk market participation by reduced milk market participation. That means the increased of non-dairy source income from non–market participant. According to the respondents, the dairy activity is not the major occupation of the smallholder dairy farmers, about 51.9 % of the respondents said dairy farming was not their major job and the remaining 48.1 % of the respondents said dairy farming was their major occupation. So, most of the respondents who are participating in dairy framings are employer in government and private agency, traders and individuals who are hired in informal sectors. The main motivator for involving in dairy activity was profitability. There were also other milk producers who involved in dairy activity due to having an experience and profitability.

Market price

In terms of market price, the result indicates that the average milk price by market participants was 12.25 birr, while that of non-market participants was 12.22 birr. The overall mean of market price by sample producer was 12.24 birr. The result of t-test indicates that statistically insignificant, meaning that the market price between milk producer market participants and non-market participants were equal price.

Distance from market

In terms of distance from market, the assessment on this variable, measured in kilometer. Most of the sample milk producer near from home to market to sell their milk yield. While in village market infrastructure is fairly low to take their commodities to the nearest market. The result indicates that the mean of distance to the market for market participant was 2.54 kilometer while

that the non-market participant was 3.13 K, m. The overall mean of distance to the market for sample respondents was 2.67 km. The result of t-test shows that distance to the nearest market was statistically insignificant, meaning that the distance between milk producer market participants and non-market participants were almost similar.

Education level of the household head

In terms of educational status of household head, the educational background of the sample household heads is believed to be an important feature that determines the readiness of household head to accept new ideas and innovations. More educated farmers are expected to adopt new technologies to increase the milk yield. The result indicates that 61.27% of market participants were literate, while 12.25 % was illiterate. On the other hand, 20.58 % of non-market participants were literate, while 5.88 % was illiterate. The overall education status indicates that 16.17%. 48.52%, 24%, 11.3% are illiterate, primary school, secondary and high level are respectively. Therefor the overall educational status of the sample respondents were dominated by literate which accounts 81.86% (not only include a milk producer to attended formal education but also they attended informal education or read and write) and the remaining 18.14 % were illiterate. The result of chi-square shows that educational status of sample households was statistically insignificant meaning that educational status was not affect the market participation of sample households.

Access to credit

Access to credit, is one way of improving the production and productivity. Due to increase the ability to purchase inputs such as: improved breed, concentrate feed and expanded dairy farm. Farmers with access to credit can minimize their financial constraints and buy inputs more readily than those with no access to credit. Thus, it is expected that access to credit increases the production of milk yield however the study area inadequate access to credit.

Table 4: χ^2-test for Demographic and Socio-economic characteristics of sample respondents (dummy) variable

Variables	Characteristic	Market participation%	Non-market participation%	Over all %	χ^2-value	Sig.
Sex	Male	53.92	17.65	71.57	0.8673	0.352
	Female	19.61	8.82	28.43		
Education level	Illiterate	12.25	5.88	18.14	0.825	0.364
	Literate	61.27	20.58	81.26		
Credit	Yes	15.196	3.03	18.63	1.55	0.212
	No	58.33	23.03	81.37		
Extension access	Yes	58.33	13.23	71.56	16.793	0.000***
	No	15.196	13.23	28.43		
Market information	Yes	58.33	12.25	70.58	20.87	0.000***
	No	15.196	14.21	29.41		
Feed access	Yes	42.125	16.6	58.82		
	No	31.37	9.80	41.17	0.519	0.471

Note: ******* are statically significant at 1% significance level**.**

Source: Survey data, (2017)

In table 4 the result indicates that 15.19% of market participants had gets credit access, while 58.33 % were not get credit. On the other hand, 3.43% of non-market participants had get credit access, while 23.03 % of had not get credit access. The overall access to credit status of sample respondents were dominated by no credit access users, which accounts 18.62% and the remaining 81.37 % was not get credit access. The result of chi- square test shows that credit access of sample households was statistically insignificant meaning that access to credit was not affect the market participation of sample households. An access of credit service on marketing through financial source plays an imperative role in empowering the ability to increase the purchase inputs.

Access to extension service

In Table 4 shows access to extension service on marketing is expected to have direct influence on marketing behavior of the farmers. A higher access to extension service on marketing participate fills gap (the required knowledge) and improves market efficiency. The result shows that 58.33% of market participants had access to extension service, while 15.196 % did not get extension access. On the other hand, 13.23% of non-market participants had get access to extension service, while 13.23 % of was not get extension access. The overall access to extension service status of sample respondents were access to extension service, which accounts 71.56 % and the remaining 29.41 % did not have an access to extension service. The result of chi-square test shows that access to extension service on marketing of sample households was statistically significant at 1% significance level meaning that access to extension service on marketing was affect the market participation of sample households

Access to market information

In terms of access to market information, the amount of marketed surplus primarily depends on access to market information and willingness and ability of farmers to use the information.
As the Table 4 result indicates that 58.33 % of market participants were get market information, while 15.19% was not get market information. On the other hand, 12.25 % of non-market participants were get market information, while 14.21 % was not get market information. About 70.58 % of sample households got market information, while 28.43 was not get market information. The result of chi- square test shows that access to market information of sample households was statistically significant at 1% significance level meaning that access to extension service on marketing was affect the market participation of sample households. Therefor the role of market information in decision making process is to reduce risk and uncertainties related to market and enable to households to make the right decision in sales and the price of product produced and inputs used in the production process..

Access to feed

In terms of access to feed, is the one way of increasing the production and productivity. As the table (4) result indicates that 42.15% of market participants were access to feed, while 31.37 % were not get feed access. On the other hand, 16.6% of non-market participants was get access feed, while 9.8 % of had not feed access. The overall access to feed status of sample respondents were accounts 58.82% and the remaining 41.17 % was not feed access. The result of chi- square test shows that feed access of sample households was statistically insignificant meaning that access to feed was not affect the market participation of sample households. Because most sample respondent live in village and access to pasture land

4.1.1.1 Major constraints and opportunity of milk production and marketing

Dairy production and marketing in the study area was found to be constrained by a number of factors related to production and marketing

Table 5:- Major problems associated with milk production and marketing

No	**Problem**	**Urban area(98)** %	**Pere-Urban area(106)** %	**Total area (204)** %
1	Market problem	9.18	91.5	51.96
2	Farm land	86.7	10.4	47.05
3	Credit access	57	62.26	59.8
4	Availability and cost of feed	76.53	42.45	58.8
5	Inadequate animal health crevice	25.5	40.56	33.33
6	Cost of improved dairy breed	14	46.22	30.88

Source: Survey data, (2017)

Inadequate access to credit

Access to credit for financing investment and farm operations is crucial to the commercialization of smallholder milk production. However, the survey result 81.37% did not have access for credit and limited their production. As the table 4 results indicates that 91.5% of Pere urban area dairy producer respond credit problem while in urban area the reverse 9.18 %. The respondents reported that inadequate credit access ranked as second problem in the study area the overall credit problem in the survey area is 51.96 % or willingness to loan or wished to add more cows if they get access credit to finance their dairy farm. This highlights that shortage of finance was found to be one of the critical problems in dairy production for sampled dairy producers. Moreover, the credit system was not well developed in the study areas. Private Banks was not interested to finance for dairy production in particular due to the risks associated with dairy production and marketing activities. Micro credit is typically used for short-term loan and high interest like Amhara Credit & Savings Institution.

Animal health problem

The Table 5 indicates that 40.5% of Pere-urban area dairy producer respond health service, while in urban area is 25.5 %. The overall health service in the survey area is 33.3 % delivery system of animal health services to dairy farmers is considered inadequate. Animal health services was limited by few government veterinary services, lack of skills in different aspects of dairy activities were among the other problems encountered in the studied areas. Poor milk cattle management system had negative impact on milk production system of the area. As the key informant interview survey the major milk production diseases happened in the study area such as mastitis, abortion, long calving interval, and late age at first mating and were varied from production to production.

Availability and cost of feed

The Table 5 indicates that 76.53 % of urban area dairy producer respond inadequate feed availability and high cost of concentrate feed while in Pere urban area the 42.45 %. The overall availability and cost of feed is 58.8 %. According to the respondents feed, usually based on fodder and grass, were either not available in sufficient quantities due to fluctuating weather

conditions or when it is available, it would be in a position of poor nutritional quality. Moreover the major feed problems high costs of fodder and increased at an alarming rate, On the other side there was lack of concentrates feed due to less availability of raw materials (ingredients like meat and vitamin premix) for preparation of concentrate feed in the feed factory. Feed and feeding problems facing the dairy sector are insufficient quantity of forage produced on the farm, insufficient inputs for commercial feeds, a lack of quality feed formulation, and the absence of feed testing for analysis. During the survey animal feed composers or factory was not available in the study area, so dairy producers' uses only some part of concentrate for their cows, these constraints result in low milk production, longer parturition intervals, and low animal weights.

Shortage of land

The table 5 indicates that 86.7 % of urban area dairy producer respond shortage of the land, while in pere urban area 10.5 %. The overall of land limited in the survey area is 47.05 %. As the respondents ranked was less access to farm land that can hindered dairy development in the urban area from 96 dairy producer households 85 producer as a serious problem and as constraints for expansion of dairy. As it is discussed in the above section of land holding of respondents, when the number of cows increases the demand for land increment were increase. Besides, land is important to prepare improved feed by planting different types of grass like alfa alfa, elephant grass. Therefore, incremental of milk production and minimize cost of feed. Most urban producers keep their cattle within their own residence compound, which is not usually more than 106–200 meter square. Even if dairy producers are interested to expand their dairy farm, the land size may not allow most of them to prepare. As land size increases more and more facilities become inevitable that take-up space other than the animal barn.

Cost of improved dairy animals

The table 5 indicates that 42.22 % of pere urban area dairy producer respond the cost of pure dairy breed was high and while in urban area the 14.58 %. The overall cost of pure dairy breed was high 30.8 %. Low productivity of the endogenous cattle breeds were major factors limiting dairy productivity in the Pere urban areas. These constraints result in low milk, high mortality of young stock, longer parturition intervals, and low feed conversion efficiency, limited artificial

Insemination services and poor dairy cattle management system were vital problems that were exhibiting negative impact on dairy production system of the areas.

Inadequate market to access

According to the respondents, there was 91.5 % of Pere urban area inadequate market access while in urban area market access 18 %. The overall market problem in the survey area is 51.96 %. The respondents tell as inadequate market access was a number one problem in the Pere urban area. Due to the reason in rural area no market access, surplus milk production when the fasting time and feed access, inadequate milk collector or milk supplier, absence of private or government dairy processing plant, seasonality of milk demand like the Orthodox followers has 200 day fasting from milk consumption, There is no promotional activity being carried out by various government offices to portray milk as a highly nutritious and essential food for the health of the nation. There are also no price regulatory mechanisms in place that can make such an important food item easily available and affordable to a large segment of the population.

The researcher also conducted focus group discussion. The discussion was held with members of dairy marketing cooperatives namely Jantkel milk union. The Focus Group Discussion was held with 5 female and 3 male milk producer participants from the selected dairy cooperatives member .Most focus group discussion participants were rural people. There was as the group discussion weak habit and poor understanding on the importance of milk, general understanding that milk has something good to our body, the level of knowledge about the comprehensive nutritional value of milk is not well understood by majority of the community.

There are a number of highlighted constraints that hamper further development of dairy sector in the elected areas. Given the current production level, there appears that the producers have had market problems due to long fasting dates. As it was noticed from the discussion, Fasting dates have a downbeat impact for milk selling in the selected sites. The Orthodox followers has 200 day fasting from milk consumption. In addition to the above problems, Lack of market, inadequate milk collector or milk supplier, absence of private or government dairy processing plant. There is no promotional activity being carried out by various government offices to portray milk as a highly nutritious and essential food for the health of the nation. The last

problem is lack of commitments in the dairy production and marketing activities were also being experienced.

4.1.1.2 Opportunities to dairy development / Prospects/

The future prospects of dairying seem to be bright because the constraints so far indicated above are noticed and the government is attempting them remedy through policies and strategies. Thus, dairy farmers are on the way to getting access to services and inputs that could help promote dairy production and productivity. This mainly includes feed and feeding, breeding services, credit, extension, training, veterinary services, and appropriate marketing system that addresses consumers' demands etc. (Amha, 20016).

Since dairying is labor intensive it promotes the government policy in creating employment opportunity at household level. Thus, it improves employment, income and nutrition values of the family of the producers and the other demanders/ consumers. The dairy industry would address and serve as one of the major instruments of the government's policy in achieving food security. This in turn promotes dairy production due to the attention given by the government.

Based on responses of study participants and personal observation the dairy production related opportunities identified were access absence of cultural or religious prohibition of dairy products consumption could also be cited as positive factor for future development. Development of infrastructure like transportation would help change the traditional thinking of 'fresh milk not for sale' other than exclusively intended for home consumption among the rural population, Dairy producers also expressed their willingness to continue to work and expand their dairy farming activities. The rapid urbanization of town with that of human population, increase provision of credit, extension and training services, production and entrepreneurial skills development, government has willing to sustainable dairy development.

4.1.2. Socio-economic and demographic characteristics of milk and butters traders

The survey was depicts that age, education, marital status, religion, credit access, capital, family size, experience and quantity milk and butter supply marketed per trader. The table 6 and 7 presents demographic and socio-economic characteristics of the trader respondents. The total sample size of the milk and butter trader respondents handled during the survey was 24. The result indicates that out of the total sample respondents, 91.6 % were female headed households and 8.33% were male headed households. In terms of milk trader, 50% were female headed, while 40% were male headed. In terms of butter trader female account 66.6% while 33.3% where male headed. This indicates shows majorities of sample respondents were female headed households in the study area. This implies that the participation of male in milk and butter traded was very low; this might be related with efficient traded female better than male

The survey on the age of sample household, measured in years, provided a clue on working age of households. The result in table 6 showed that the average adult milk and butter trade participant was 44 years old. In terms of butter trader 40 years old while in milk trade participant 47 years old. The result of F-test shows that age was statistically significance at 10% significance level. That means the mean age is the single most important factor of traded and a measure of experience in the study area. In terms of marital status was 12.5%, 25% and 50% respectively divorce, single and married, respectively. The overall marital status of sample traders was by married traders, which accounts 50%.

In terms of educational status, the result indicates that sample traders were, 25% illiterate, 25%, 33.3% and 16 % respectively of traders have attended primary school, secondary and high grad level. The result of chi-square shows that educational status of milk traders was statistically significance at 1% significance level. In terms of family size, the overall average family size of sample traders was 3.76 while the average family size of milk trader 3.1 while butter trader where 4.25.The result of F test shows that family size of milk traders was statistically significant at 1% meaning that there was mean difference among the family size.

Table 6: Demographic Characteristics of milk and butter Traders (percent and mean)

Variable		Milk trader			Butter trader		
		%	Chi 2	Sig	%	Chi 2	Sig
Sex	Female	66	9.00	0.02	66	9.00	0.02**
	Male	33			40		
Religion	Orthodox	25	5.77	0.216	66.6		
	Muslim	75			33.3	3.00	0.392
	Protestant	-					
Marital statues	Divorce	16	7.24	0.29	28.33	7.24	0.29
	Single	25			25		
	Married	58			41.6		
Education	Illetrant	25	10.93	0.28	25	10.93	0.28
	Primary	25			25		
	Secondary	41			25		
	High level	8.3			25		
Credit to access	No	83	2.4	0.49	100	2.4	0.49
	yes	16					

** represents to 5% significance level

Source: survey result, (2017)

In terms of trading experience, the result shows that average milk trader 7 year while for butter trader 7.66 years' experience. The overall average trading experience of sample traders was 7.33 years. The result of F-test shows that trading experience of traders was statistically insignificant meaning that there was not mean difference. With regard to religion, 66.6% and 25% of sampled butter and milk traders respectively belonged to Orthodox while 75 % and 33 % milk and butter trader Muslim religions. The result shows that the majority of milk and butter trader

responded were Muslim religious follower. Probability distribution insignificant however it was different

In terms of financial capital of sampled butter and milk traders as the survey result indicated that average initial working capital for milk trader and butter traders were during 2016/2017 110,991 ETB and 26,992 ETB. According to the assessment, most traders are experiencing additional trading activities other than butter. In terms working capital access to credit 91.66 % of did not were access for credit and limited their trading activity. While 16.6% trader where access to credit. This indicates that own source of initial working capital for butter traders was more important than that of milk traders which is perhaps due to fear of running into debt because of highly fluctuating demand for butter and lack of collateral.

Table 7: Socio-economic characteristics of milk and butter traders

Variable	Milk trader			Butter trader		
	Mean	Stand.dev	F-value	Mean	Stand.dev	F-value
Age (mean)	47.91	8.73	1.08	40.8	8.17	0.06**
Capital	26.9	26.9	13.26	110,9	199.1	26.34
Experience in milk marketing (Year)	4.25	1.54	1.85	3.1	1.19	0.000***
Family size (mean)	7.66	3.96	4.14	7	4.1	4.93
Quantity	23.16	19.47	0.005	65.8	96.8	15.65

** And *** represents to 5% and 10% significance level, respectively

Source: survey result, (2017)

4.1.2.1. The major milk and butter marketing chain actors and their roles

Dairy producer: The first link in the milk and butter marketing chains. Producers are predominantly smallholders and have always supplied milk and butter for consumption to

neighbors as the most efficient way to dispose of surpluses quickly and cost effectively for payment or other form of value exchange. Producers do supply more distant consumers directly depending on individual circumstances such as the amount of surplus, the cost of transport and the availability of sales in the immediate locality. There are obvious economic trade-offs for dairy in both extra costs and time incurred, limiting how far and how much effort producers were make. Prices paid by consumers depend on the region (milk-surplus/deficit area), but even more so the micro-locality of milk available in the immediate neighborhood. The directness of the channel with no intermediaries or transport/processing costs results in considerable cost savings to both parties. The less availability of pasteurized milk and the high cost of long-life milk/imported dairy products in the milk-shed mean that there is little real competition for raw milk in the area.

Dairy Cooperatives: The dairy cooperatives of the milk shed accounts for about 79.4% of total milk marketed per day. Dairy producers' cooperative societies operational during the survey period in the milk shed were Lamebora, Dashen and Jantekel dairy. Among the cooperative was Jantkel milk:-

The dairy producer's cooperative (jantkel): The cooperative is located at Gondar town. During the survey period, the amount of milk being collected from milk producer (founding members) was 300 liters per day or 9,000 liters per month which accounts for 260 (33.3) litter of total milk marketed per day through various channels in Gondar town during the survey period.

According to the informal discussion made with the chairperson of the Jantekel cooperative, raw milk processing into butter and cheese, which was more occasionally done during intense fasting period, was found to be unprofitable. The cooperative was found to purchase raw milk from the members only at 9 ETB per litter and sale it for 11 ETB per litter on wholesale and retail basis to catering shops, hotels and restaurants, kiosks, individual consumers in to Gondar and Bahardar. The cooperative was also selling butter which is mainly produced during the big fasting period.

Rural assembler: These market actors stand for milk and butter business activities. It also milk supply by transporting milk from rural area surplus production to milk deficient market areas. It refers to those milk and butter traders that are characterized by lack of fixed premises and the proprietors predominantly run the business personally. They purchase milk and butter

from neighbor areas and sale at business site or supply to urban area. Their mode of transport is mainly public transport and sometimes on foot. They involve casual workers in transporting, loading and unloading activities. Almost all the milk and butter being traded in the area was found to be imported from other areas. This milk and butter in turn was delivered to the customers in urban market places, kiosks, bars, hotels, restaurants and individual government and non-government employees in their residence.

Semi-whole seller: Is an important butter market intermediary, those are performed the function of both retailing and wholesaling depending up on market conditions. The informal survey revealed that the existence of semi-wholesalers in milk marketing channels; however, semi-wholesaling function is non-operational in Gondar for butter business undertakings. The census for the survey revealed that there were three butter semi-whole sellers whose residences are in Gondar and Bahardar.

Retailers: These include dairy marketing intermediaries such as super markets and other small and large–scale retailers who trade dairy as part of other retail activity mainly involving sale of other household consumer item in like shops and kiosks. The retailers divide large amount of produce and sell it to consumers in small units. Many of the retailers in the study areas were not licensed to sale/handle butter and milk Moreover, all milk traders but cooperative society did not have milk-testing equipment such as hydrometer and alcohol, testing kits for water adulteration and bacterial development during their purchase. However, some of the traders found to use regular supplier in order to develop their own supplier quality, like Jantkel milk cooperative.

Hotels and restaurants: Most hotels, restaurants and shops serve milk to consumers. These market actors stand for milk and butter business activities through direct and indirect selling to consumer. These direct and indirect intermediaries were selling through add value to the milk and direct the demand consuming. This actor's account from total milk and butter are 6.29% and 12.58 % respectively. They serve for their customers even though; the cost and benefits of these actors are not included in this market chain analysis due to the complex nature of the business undertaken by the actors. They get the supply from different actors' producer, cooperative and rural assemblers who are involved in the transaction process.

Consumer: This is the last link in the dairy marketing chain. From the consumer point of view, the shorter the marketing chain, the more likely is the retail price going to be low and affordable. Consumers' consumption patterns/demand structure, purchasing power and traditions/norms are assumed to largely affect the potential market for agricultural commodities in general and dairy commodities in particular.

4.1.1.1.1 Dairy marketing channel

Milk and butter produced in Gondar city passes through different channels before it reaches the end users/consumers. In this study, different market actors were involved in bringing milk and butter from the point of production until it reaches the final destination (consumers). The number of intermediaries in the given marketing channels have a bearing effect on both producers and consumers milk price. The shorter the channel the more likely that the consumer price will be low and the producer will get a higher return. The study area milk and milk was found to be supplied from rural to city. However only locally produced milk was found to be marketed in rural area as the area have surplus production.

According to the data obtained the market participants identified in the transaction process of milk and butter in the study area include: producers/farmers, rural assemblers, cooperatives, retailers and semi-wholesalers. The market participants involved in different activities in the study area were categorized into different categories.

As clearly depicted in figure 2, milk marketing channels were constructed based on the data collected from sampled markets 8 main alternative marketing channels of milk were identified. During the production season of the year, the estimated total milk produced and marketed in the study area was 3364 litters. Out of this from the point of production until it reaches the final destination account the sample trader 787 litter.

As one can be understood from figure 7, the main receivers of milk from the producers were cooperative possess the estimated percentage of 82.59%. The rest percentage 6.35%, 5.71% and 5.33%, rural assembler, retailer, hotel and consumers was received by rural assemblers and cooperatives. Based on the volume of milk flown, marketing channels were compared with each other.

The major milk marketing channels

Accordingly, to channel 8 (Producer- cooperative - Retailer- Consumer channel) carries the largest volume of milk transacted followed by channel 7 (Producer- cooperative – hotel - Consumer channel). But in terms of channel length, channel 5, 6, 7 has equal channels length. The volume of milk transacted for channel 1 is less as compared to channel 7. As clearly depicted in figure 2 milk marketing channels were constructed based on the data collected from the three sampled markets. Eight main alternative marketing channels of milk were identified.

Producer → Consumer: As table 8 shows the channel accounts for total milk marketed 2 % per day in Gondar. The channel was found to be the shortest of all milk channels identified during the survey period in the milk shed. Therefore it is preferable for seller and buyer due to reduce cost and time.

Producer → Cooperative → Consumer: The channel where dairy cooperative are found table 8 and accounts for 19 % total milk marketed per day during the survey period. This channel was identified to be the least important milk sale out let for Gondar producers as they have relatively larger number of milk sale out lets which can fetch them better price.

Producer- hotel -Consumer: This channel used as a bridge between producers and consumer. This channel accounted 2.35% total milk marketed in the study area during the survey period. During the survey data most hotels, restaurants and shops serve milk to consumers. These channel market stand for milk business activities through direct and indirect selling to consumer. These direct and indirect intermediaries were selling through add value to the milk and direct the demand consuming. They get the supply from different actors' producer, cooperative and rural assemblers who are involved in the transaction process.

Producer → Retailer → Consumer: This channel includes retailers as an important player between producers and consumers. This channel was identified to be the most important alternative milk sale out let for milk producers and the most important supply source for retailers. Here, the role of retailers in this channel is purchasing milk from producer to consumer. Retailers influence

the expected benefits of farmers/producers. This channel accounted 6.53 % total milk marketed in the study area during the survey period.

Producer- Rural assembler-Consumer: this channel used as a bridge between producers and consumer. This channel accounted 2.54 % total milk marketed in the study area during the survey period. Mostly rural assembler was done milk business activities. It also milk by transporting milk from rural area surplus production to milk deficient market areas.

Table 8: The major milk marketing channels of the study area

No	Major milk marketing channel	Amount of milk marketing in liter	% proportions
1	Producer →Consumer	15	2.09
2	Producer →Cooperative →Consumer	150	19
3	Producer →Hotel →Consumer	42	5.33
4	Producer →rural assembler →Consumer	20	2.54
5	Producer →Retailer →Consumer	50	6.35
6	Producer→ rural assembler →Hotel →Consumer	25	3.17
7	Producer →Cooperative →Hotel →Consumer	200	25.41
8	Producer →Cooperative →Retailer →Consumer	284	36.11
	Total	787	100

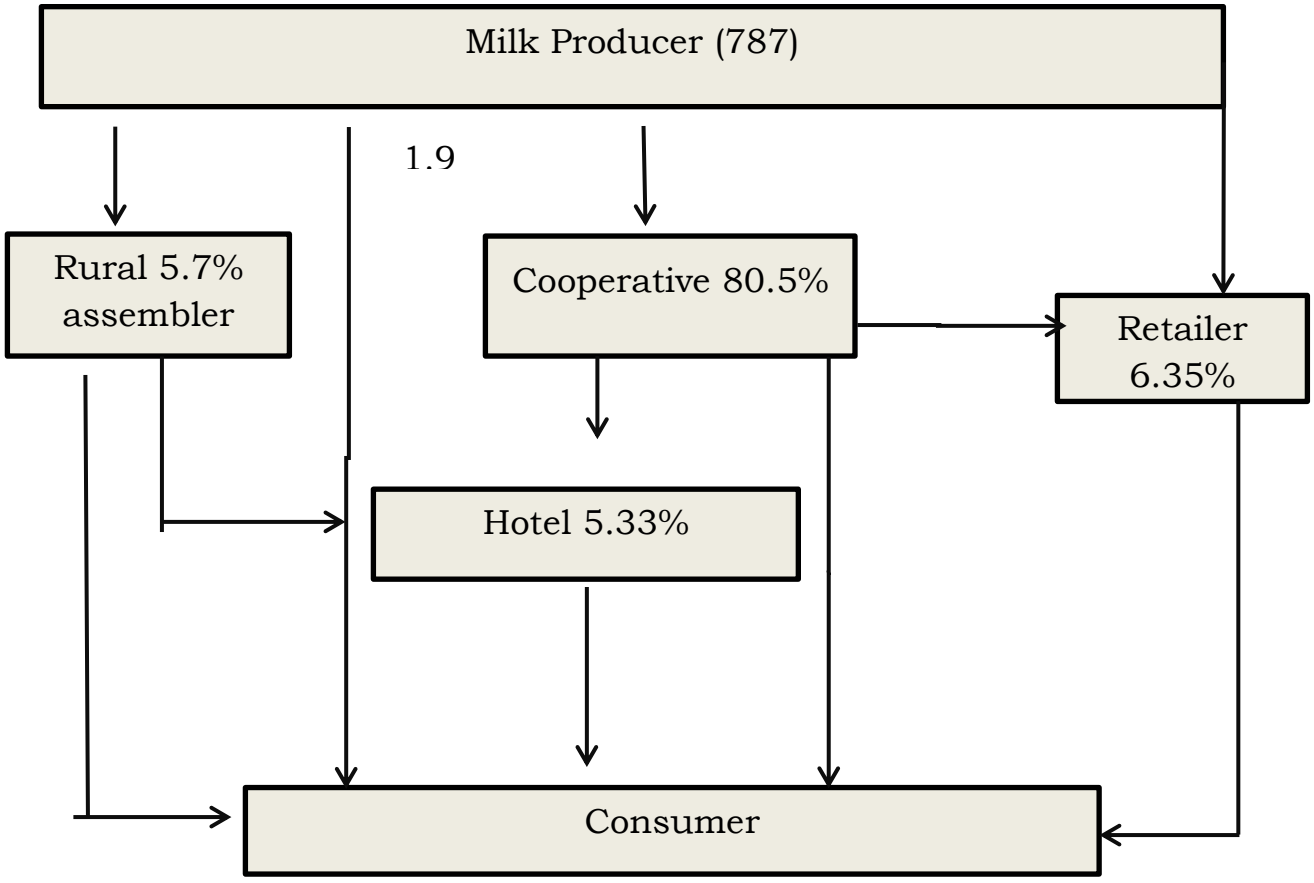
Source: Survey data, (2017)

Producer- Retailer-Consumer: This channel includes retailers as an important player between producers and consumers. Here, the role of retailers in this channel is purchasing milk from producer to consumer. The town retailers influence the expected benefits of producers. Since the informal action of retailers has an impact on per unit price setting of price. This channel accounted 6.35% total milk marketed in the study area during the survey period. It is the second important channel in the study area in terms of volume marketed.

Producer → cooperative →Retailer → Consumer: this channel had the first important channel in the study area in terms of volume marketed. This channel was identified where milk sellers cooperative undertake both retailing and wholesaling activities. Milk cooperative sellers link producers and retailers and hotel in three way when they undertake bulk selling to retailers, and in other way, they link producers and consumers when they under take retailing -functions. This channel represents 36.11 % of total milk marketed per day in Gondar and Bahardar. In terms of volume of milk marketed in the milk produced area per day, the channel was found to be the largest of all the milk-marketing channels identified during the survey period. This was the case because this channel was the most reliable and best alternative source of milk supply for retailers, where demand for milk exceeds supply of milk.

Producer → Cooperative → hotel → Consumer: It is the second important of the channel important in terms of volume marketed. The channel account for 25.41% of total milk marketed per day. It seems like the important as compared to other marketing channels. This seems the case because of enough access the volume of milk sold through cooperative. The fundamental reason among others why hotel and retailers prefer to purchase from this source seems to be to avoid risks associated with fluctuating demand for milk. If producers are to sale for retailers and retailers are to buy from producer, the amount/volume should be fixed for both parties regardless of demand level which may lead them unnecessary loss.

Figure 2 Milk supply channel Gondar city



Source: Survey data 2017

Butter market channel

Producer → Consumer: This channel is found to involve the direct sale of butter to consumer in the immediate neighborhood and local market places. The channel was the shortest in terms of intermediaries and smallest in terms of volume of butter and value. The channel represents 1.8 % of total butter marketed per month in. The channel is used mostly for cosmetics butter rather than cooking butter. This is the smallest marketing channel in the study area in terms of volume marketed.

Table 9: The major butter marketing channels of the study area

No	Major butter marketing channel	Amount of butter marketing in k.g	% proportions
1	Producer →Consumer	5	1.7
2	Producer →rural assemblers →Consumer	15	5.36
3	Producer →Hotel →Consumer	20	7.1
4	Producer →retailer →Consumer	25	8.99
5	Producer →Retailer → hotel →Consumer	30	10.79
6	Producer → rural assembler →retailer →Consumer	33	11.87
7	Producer →semi-wholesaler →Hotel →Consumer	90	32.37
8	Producer →semi-wholesaler →retailer →Consumer	60	21.58
	Total	278	100

Source: Survey data, 2017

Producer → rural assembler →Consumer: This channel accounted 5.4 % total butter marketed in the study area. In this channel connect through as a bridge between producers and consumer. This channel was identified to be the most important alternative butter sale out let for butter producers and the most important supply source for retailers. Here, the role of rural assembler in this channel is purchasing butter from producer to consumer. Retailers influence the expected benefits of farmers/producers

Producer → Hotel/ restaurant/café / →Consumer: this channel used as a bridge between producers and consumer. The channel accounted 7.2 % total butter marketed in the study area. During the survey data most hotels, restaurants and shops serve milk to consumers. These channel market stand for butter business activities through direct and indirect selling to consumer. These direct and indirect intermediaries were selling through add value the cooking butter and direct the demand consuming. They get the supply from different actors' producer, cooperative and rural assemblers who are involved in the transaction process.

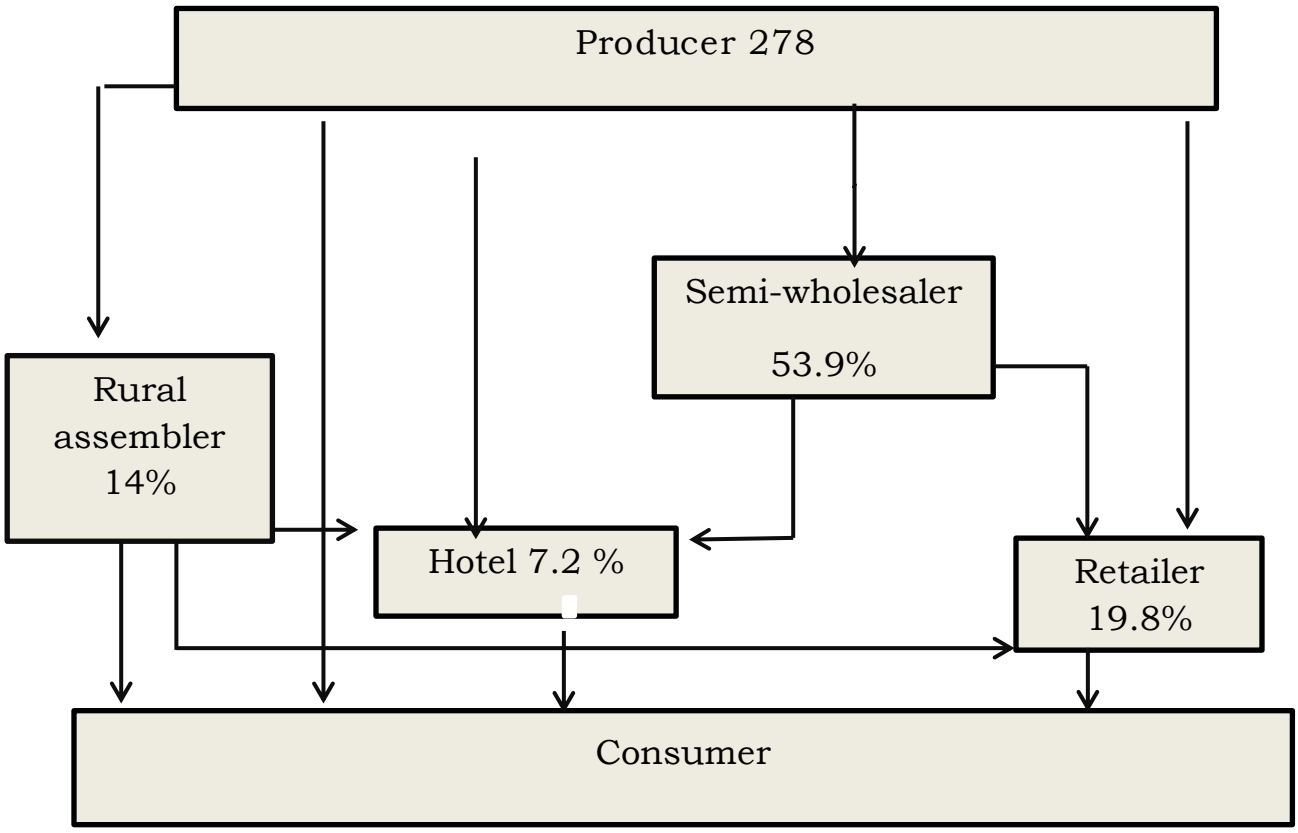
Producer → Retailer → Consumer: This channel includes retailers as an important player between producers and consumers. This channel was identified to be the most important alternative butter sale out let for butter producers and the most important supply source for retailers. Here, the role of retailers in this channel is purchasing butter from producer to consumer. Retailers influence the expected benefits of farmers/producers. This channel accounted 8.99 % total milk marketed in the study area during the survey period.

Producer → rural assembler→ hotel →Consumer: The channel accounts 10.79 % of total butter marketed per month during the survey period. In this channel connect through as a bridge between producers and consumer. This is the smallest marketing channel in the study area in terms of volume marketed.

Producer → rural assembler→ Retailer → Consumer: The channel accounts for 11.87% of total butter marketed in during the survey period. This channel was identified to be the most important butter-marketing channel in terms of volume.

Producer → Semi-wholesaler → Retailer → Consumer: This channel account for 53.95 % of total butter marketed per month were lacking the channel because there were no farmer butter traders and semi- wholesalers to link retailers and consumers.

Figure 3: Butter supply flow for Gondar towns



Source: Survey data 2017

4.1.3. Analysis of structure conduct and performance of milk and marketing

The study employed structure-conduct and performance to evaluate the degree of competition, behaviors of marketing actors and their achievement in milk and butter marketing in Gondar city.

4.1.3.1. Market structure

Market structure in food marketing is analyzed based on the number of buyers and sizes of enterprises within the system, the degree of market transparency and the condition of entry to and exit from trade (Scarborough and Kydd, 1992: cited by, Dawitr, 2010)

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In this study the market structure of milk and butter is assessed using market concentration ratio, degree of market transparency, flow of market price information within markets and condition of entry into and exit from trade. For this reason, educational level, trade experience, licensing procedure, lack of working capital and policy barriers are used as a clue to examine the milk and butter market structure in Gondar city. The result is listed as follows:

Degree of market concentration

Market concentration refers to the number and the relative size distribution of buyers and sellers in the market. For an efficient market, there should be sufficient number of firms (buyers and sellers). Firms of appropriate size are needed to fully capture economies of scale; there should be no barriers to entry into and exit from the market, and should have full market information. The concentration ratio is expressed in terms of CR which stands for the percentage of the market sector controlled by the biggest X firms.

As indicated in table (10 and 11) the four traders' concentration ratio (CR4) for milk trader was about 71.79 % and while for butter trader 64.74% market concentration. This table indicates that

Table 10: Concentration ratio for milk sample traders

Number of trader	Cumulative frequency of traders	Percentage of trader	Cumulative % of trader	Quantity purchased	Total quantity purchased	Share of purchase	Cumulative purchased
1	1	8.33	8.33	300	300	38.11	38.11
1	2	8.33	16.66	200	200	25.41	63.52
1	3	8.33	24.99	150	150	19.05	82.57
3	6	25	50	20	60	7.62	90.19
3	9	25	75	15	45	5.71	95.9
1	10	8.33	83.32	12	12	1.52	97.42
2	12	16.66	100	10	20	2.54	100
		100			787	100	

Source: own computation from survey data, 2017

Table 11: Concentration ratio for butter sample traders

Number of trader	Cumulative frequency of traders	Percentage of traders	Cumulative % of trader	Quantity purchased	Total quantity purchased	Share of purchased	Cumulative purchased
1	1	8.33	8.33	33	33	11.8	11.8
4	5	33.33	41.66	30	120	43.16	54.96
1	6	8.33	49.99	25	25	8.99	63.95
4	10	33.33	83.98	20	80	28.77	92.72
1	11	8.33	92.31	15	15	5.39	98.11
1	12	8.33	100	5	5	1.79	100
12		100			278	100	

Source: the survey data, (2017)

The market is strongly oligopolistic. Therefore, milk and butter market showed strongly oligopolistic structure. This indicated that, there is market imperfection because of few traders like the union of cooperative seems to have monopolized the milk markets.

Degree of market transparency

The degree of market transparency refers to the timeliness and reliability of market information that the traders have for their marketing decision. In a transparent market, participants have adequate information about their competitors regarding their source of supply and buying prices for better decision. Based on this essence, the assessment on the continuum indicated, only 70.58% and 83 % percent of producers and traders respectively have reported as they have adequate, timely and reliable information in the study area .While the reaming producer and trader had not information research result has implied that, the market of the study area is well characterized by lack of transparency in timeliness and reliability. The result has also ascertained that traders have more privileged in information access than producers. The reality assisted traders take hold of better market information through cellular phones. The traders' survey result has also indicated the sample traders got price information through combination of telephone, personal observation and other traders. The rest of the traders reported that they could guess market information from the acts of other traders (e.g. interest to buy large volume of milk and butter at higher prices).

Barriers to entry and exit

The ease with which potential participants can enter various functions is commonly used as a means of assessing the degree of competition in an industry (Scarborough and Kydd, 1992; cited in Ayelech, 2010) suggests about four points that can create barriers to entry: legal barriers (license and patents), economies of scale, superior resources, and pace of entry. The barriers to entry into milk and butter market reflect the competitive relationships between existing traders and potential entrants. If the barriers to entry are low, new traders can easily enter into market and compete with the established traders. Trade barriers have often leaded the groundwork for market imperfection. Whether by intent or not, many regulatory actions by state

or local units have the result of restricting freedom to entry and the free flow of goods and services. The major barriers to entry into milk and butter market include lack of working capital, administrative problem, information collusion and stiff competition with unlicensed traders.

Table 12 : Barriers to entry trader

Variable related problem		Milk trader		Butter trader	
		Number	%	Number	**%**
Credit access	No	0	0	2	16.6
	Yes	12	100	10	83.3
Information	No	10	83.3	8	66.6
	Yes	2	16.6	4	33.33
License	No	4	33.3	7	58.33
	Ye	8	66.6	5	41.6
Suppliers problem	No	3	25	4	33.33
	Yes	9	75	8	66.66
Adult-ratio problem	No	3	25	1	8.33
	Yes	9	75	11	91.6
Transport	No	7	58.33	7	58.3
	Yes	5	41.7	5	41.6
Mobile	No	0	0	2	16.6
	Yes	12	100	10	83.3
Business managing	No	7	58.33	9	75
	Yes	5	41.7	3	8.33
Seasons(fluctuate)	No	0	0	5	41.83
	Yes	12	100	7	58.33

Source: own computation from survey data, (2017)

High price fluctuation

Besides small investment capital requirement, highly volatile price of milk and butter particularly local level prevents traders to be engaged confidentially in milk marketing. The study result indicated that, about 50 % of the respondents claimed that the major milk marketing problems are seasonality of production source of milk coupled with higher perishability. Fasting date and industry processing from market and major rural area have an important effect on price of milk. Generally, the study observed that there is no exit rule and regulation as such on milk marketing. So the price fluctuate had barrier to enter market

Legal and policy constraints

License of milk trade Marketed commodities may pass from producers to consumers directly or it may pass through two or more market agents who are characterized by no licensing/ or licensing requirements to generate the business and no regulation/ or regulation of operation. Licensing is a major barrier in many business activities. In line with dairy products business activities of the milk shed, According to the sampled traders' survey result 33% and 58.33% sampled traders did not has butter and milk trade license, respectively while 66.6 and 41.66 % of milk and butter respondents said that the trade needs license. Table 12 indicates that, regulation is weak and there is no restriction to enter in the illegal trader. Nature of commodity and seasonality of demand for butter and milk: As the survey result highlighted that about 70.8 % of the respondents claimed that their major milk and butter marketing problem was seasonality of demand associated with highly perishable nature of milk. The informal survey further confirmed that there were milk and butter traders run out of their business activities because of the fact that they had incurred lose/run into debt due to highly fluctuating demand associated with perishable nature of dairy products in general and milk in particular. This indicates that highly fluctuating demand associated with perishable biological nature of dairy product was found to create strong milk and butter market entry and exit barriers. This indicates that the sector was receiving no due attention from government side or anybody else. Since the majority of traders lacked trading license in both butter and milk and butter trading activities but as the respondent said that the trade license did not create market entry and exit barriers

Managerial Know-How

Managerial know how refers to the ability and knowledge of dairy product traders and it was examined by level of traders' formal education and their trade experiences.

Formal Education: The result of traders' survey in table 12 points out that 25% and 25% of butter and milk traders, respectively were found to be illiterate while % of sampled butter and milk traders and 50% % of sampled milk traders were found to be literate. About 49.3% of milk traders and 50 % of milk traders had joined junior and secondary high school, respectively. This result portrays that formal education seemed to create entry barrier into butter and milk market. The survey result confirms that traders' educational background was found to be more important in milk market entry than butter market as milk traders were found to be more educated than butter traders were during the survey period.

Nature of commodity and seasonality of demand for butter and milk: As the survey result highlighted that about 47.2% of the respondents claimed that their major milk and butter marketing problem was seasonality of demand associated with highly perishable nature of milk. The informal survey further confirmed that there were milk and butter traders run out of their business activities because of the fact that they had incurred lose/run into debt due to highly fluctuating demand associated with perishable nature of dairy products in general and milk in particular. This indicates that highly fluctuating demand associated with perishable biological nature of dairy product was found to create strong milk and butter market entry and exit barriers

4.1.3.2. Market conduct

Market conduct refers to the exchange practice and pricing behavior of the marketing firms that make up the industry to examine the influence of the existing market structure on the market conduct and the bargaining power of marketing actors in the marketing system.

Market conduct refers to the patterns of behavior of firms. This implies analysis of human behavioral patterns that are not readily identifiable, obtainable, or quantifiable (Pomeroy and Trinidad, 1995; cited Woldemichael, 2008).There is no agreed upon procedures for analyzing the elements of market conduct. Rather, some points are put to detect unfair price setting

practices and the conditions under which such practices prevail. In this study conduct of milk and butter market is analyzed in terms of the traders' and price setting, purchasing and selling strategies.

Here in this analysis the market conduct of firms in the subsector have been analyzed using information like selling and buying behaviors and price setting strategy of milk and butter sample traders have been analyzed. According to the survey data was milk and butter highly supplied to market from May to November. Respondents also reported that, there were no significant produce from February to May but it may extend. Simultaneously, 55 % and 65 % of milk and butter producers sold their on cash basis, while the remaining payment is conducted through advance payment for both dairy productions.

The lack of modern postharvest handling practice and lack of facilitated storage facilities have compelled producers to sell the milk at prevailing prices. Knowing this, wholesaler and retailer put pressure on producers to sell at low price. Starting from production up to marketing, every farmer produces and sells on individual basis. This affected their bargaining power during the sale of milk and butter. Milk and milk products are very susceptible to adulteration. In study area, milk and milk product adulteration increases as the product is moved to market from areas where closer to the pre-urban and urban centers. Out of the total respondent said that 75 % of milk consumer and trader suspect adult ratio while 91 % respondent adult ratio suspect. However there is less adulteration at production level. Water is used as substance for milk adulteration while for fat oil and banana used for butter. There for the trader restrict to entre marketing due to the happen of adult ratio.

Price setting and terms of payment

The selling strategy of the respondent farmers was open to any buyer. Thus, all producers sell their produce to anybody as far as they offer better price. About 64% of the sampled traders' purchases butter from farmer and rural assembler the remained 36% from other actor. Traders are more informed than farmers regarding price of butter in local and regional markets.

Selling strategy

Respondents reported their selling strategy as spontaneous to any buyer. There was no any contract-based marketing. Respondents were asked what issues they took into account to decide for whom to sell. They responded as they offered to anybody as far as he/she offered better price. With respect to decision on butter selling price in marketing, 14.8%, 24%, 16, 5 % and 44.7% of the respondents said that the selling price of butter was set by themselves, by market price, by buyer and negotiation respectively between seller and buyer while for milk selling price set 12.4%, 37%, 14.6% and 36% of the respondents said that the selling price of milk was set by themselves, by market price, by buyer and negotiation respectively between seller and buyer while for milk selling price set.

Especially rural assembly, retailer and cooperative selling strategy are through supplying in to trader home. The other 25% of traders set their selling price according the market responses, while 18.8% sample respondents were used their purchase price as a reference to set the selling price of butter and they set the price early at the time of purchasing. Of the total respondents, 53.1% have their own shop to sell their purchase out of these 15.5% used notice board for advertising. The survey result identified that the bulk of milk was marketed through traditional channels and transactions found to take place with direct contact between seller and buyer. There were no observed operational brokers in both milk and butter market during the survey period. Some trader like cooperative the price set their own as profitability. The organized dairy cooperatives were estimated to represent about 79.4% of the total milk. With regard to contractual agreement between market actors, only verbal agreement based on personal relation, who has no legal implication, seemed to prevail for quality and supply assurance of milk.

Table 13: seller price strategy and setter on percentage

Selling strategy	Butter trader (%)	Milk trader (%)
By themselves	14.8	12.4
By market	24	37
By buyer	16.5	14.6
Negotiation	44.7	36
Total	100	100
On cash selling	65	55
On advanced selling	35	45

Source: the survey data, 2017

4.1.3.2. Milk and butter market performance

Milk market performance was analyzed by estimating the marketing margins, by taking into consideration associated marketing costs for key marketing channels. Based on production costs and selling prices of the major marketing participants along the chain, margins at producers, at, cooperative, rural assembler, retailer and hotel /café/ restaurant level was estimated and analyzed.

Marketing margin

The term marketing margin measures marketing efficiency. This is an attempt to evaluate economic or price efficiency. Marketing margin is most commonly used for evaluating market performance which refers to the difference between producer prices and end user prices of an equivalent quantity and quality of a commodity. It also describes the price differences between other points in the marketing chain, for example between producers and wholesalers, or between wholesalers and retailers price (Spencer, 1971; cited in Kizito, 2008). It is simply the difference between producer's price and price received at retailer sale. Marketing margin is the percentage

of the final weighted average selling price taken by each stage of the marketing chain. Therefore over all, marketing margin is the best tool to analyze performance of marketing.

Table 14: Average selling price of milk and butter at different market levels, milk and butter marketing margins/% share from consumer price

No	Milk trader Marketing channel participants	Selling price	% of Gross marketing margin	Butter trader Marketing channel participants	Selling price	% of Gross marketing margin
1	Producer	12.24	69.94	Producer	155	81.57
2	Cooperative	12.75	4	Rural assembler	166.6	6.9
3	Rural assembler	14	8.92	Semi-wholesalers	175	4.8
4	Retailer	16	12.5	Retailer	181.66	3.6
5	Hotel /café/ restaurant	17.5	8.57	Hotel	190	4.38
	Total		100	Total		100
	TGMM (complete distribution channel) = 30.06 % GMM (Cooperative) =4% GMM (Rural assemblers) =9.8% GMM (Retailer) =12.5% GMM (Hotel) =8.57% GMMP (Producer participation) =100%-TGMM=100% 30.06%=69.9			TGMM(complete distribution channel) = 18.4 % GMM (Rural assemblers) =6.9% GMM (semi wholesalers) =4.8% GMM (Retailer) =3.6 % GMM (Hotel) =4.38% GMMP (Producer participation) =100%-TGMM=100% 18.42 %=81.57%		

Source: survey result, (2017)

The margin covers costs involved in transferring produce from one stage to the next and provides a reasonable return to those doing marketing. It can be interpreted as a cost of providing a mix of marketing services. Therefore, milk and butter marketing margin was analyzed based on the average sale price of different marketing participants in the marketing chain. As presented in Table 11, about 30.06 % of total gross marketing margin was added to milk price when it reached the final consumer in the study area markets. Out of the total gross marketing margin 4%, 8.92%, 12.5% and 8.57%, respectively were gross marketing margin of producer cooperative, rural assembler, retailer, hotel /café/ restaurant in the study area, respectively. The producers' shares of price to the end users were 69.94 %. Therefore this situation implies that there was poor performance (inefficiency) of milk market chain. While the butter total gross marketing margin was 18.42 % added to butter price when it reached the final consumer in the study area markets. Out of the total gross marketing margin rural assemblers 6.9%, Semi wholesalers 4.8%, Retailer 3.6 %, Hotel 4.38% were gross marketing margin in the study area. The producers' shares of price to the end users were 81.42 %. Therefore the situation implies that there was efficiency of butter market chain. Because of the total gross margin is less than 20%

4.1.4. Marketing problem of traders

Table summarized the basic problems was identified sample traders. The major marketing problems sample traders face in the study area were insufficient amount of milk demand, processing plant, credit access, poor quality of the commodity, lack of market information, infrastructure problem, lack of demand, price setting problem, shortage of supply, unfair competition with unlicensed traders, government policy and no government support for commodity marketing.

4.2. Results of Econometric Analysis

Under the econometric analysis 204 sample dairy producer were included; excluding sample traders. Using Heckman two-step selection model the analysis had provided the results of the determinant factors that affect decision to participate and the volume of milk supplied to market. There are several explanatory variables that influence dairy households‟ decision to participate in milk marketing and the quantity milk supplied to market. Different researchers described these variables depending on the purpose of their study and listed relevant variables to be considered. The variables included in this study for Heckman two-step selection model were Sex of the household head , Age of the household head, Education level of the household head , Credit Access, Access to extension, Size of milk output, financial income from the non-dairy source, Distance from market, Market price, Total land size, Access to market information, Number of milking cows, Experience in dairy production, Feeding access and Family size.

The study used before running Heckman two-step selection model, to check multicollinearity problem for both continuous variables and dummy variable. Variance inflation factors were computed for continuous variables and contingency coefficients for dummy variables to see the existence of mullticollinarity among variables. According to the results no significant problems of multicolinearity and very high degree of association was observed, because the value of VIF and CC was less than 10 and 0.75 respectively. Heckman selection model results are depicted in appendix table 7.2.2 and 7.2.3. Probit model estimates indicated that 5 variables were found to be significant factors affecting the dairy household market participation decision.

4.2.1. Factors Influencing Market Participation

To determine the factors that influence market participation of milk in Gondar, a Probit model was estimated in the first stage of Heckman two-step selection equation. A total of potential variables (nine continuous and six dummy variables) were selected and entered in to the probit model, out of which 5 variables were significantly influencing the decision to participate in milk marketing. As shown in Table 15, variables having significance influence for the decision to

participate in milk marketing were Size of milk output, family size, access to market information, total land size and access to feed. The marginal effects were used for interpretation.

Table 15: The Heckman two-step selection equation result

Variable	dy/dx	Coef.	Std. Err.	Z	P>z
Sex of household	0355691	-0.32	0.44	-0.73	0.467
Age of household	-.0109794	0.059	0.05	1.25	0.21
Education level	.0102564	-0.056	0.25	-0.22	0.823
Family size	-.0318748	-0.34	0.19	-1.82	0.069*
Experience dairy production	.0115315	-0.002	0.04	-0.05	0.959
Credit access	-.0571779	-0.63	0.59	-1.07	0.286
Number of milk calving	-.0033346	-0.06	0.29	-0.24	0.81
Quantity milk output	.0122859	0.60	0.11	5.27	0.000***
Milk price	-.0350969	0.10	0.14	0.74	0.458
Nondairy source income	-.0000264	-0.00	0.00	-1.32	0.186
Distances from market	-.0003572	-0.16	0.12	-1.28	0.200
Extensions access	-.0230089	0.75	0.46	1.63	0.104
Access to market information	.0372649	1.05	0.44	2.38	0.017**
Total land size	.0117102	-2.25	0.68	-3.32	0.001***
Feed access	-.0214894	-1.00	0.50	-2	0.045**
_cons		-3.43	2.40	-1.43	0.154

Note: Dependent variable: milk market participation

*** ** and * indicates statistically significant at1%, 5% and 10% significance level respectively.

Source: Survey result, (2017)

Family size of the household: As expected, this variable was statistically significant at 10% probability level and had a negative effect on the household market participation decision. As can be seen from table 15 the result negative and significant relationship indicated that as the number of family increases, the consumption of milk at home increases, market participation decreases. The probability to participate in milk marketed averagely reduced by 3% than the other, when the number of family increased by one. As the Study of (Abbott and Mekeham, 2003: cited by, Berhanu, 2014), indicated that the marketed surplus is negatively related with the size of family and level of consumption. As family increased the home consumption increased.

Size of milk output: it is as expected; sizes of milk output had been positively and significantly influence the producer decision to participate in milk marketing at 1% significance level. The positive and significant relationship between two variable indicate that milk yield per day per household is a very important variable affecting household milk market participation. The marginal effect of milk yield per day per household indicates that the probability of participating in milk market increase by 10% as milk yield per day per household increased by a litter. Therefor the milk participation to market averagely increased by 1.2 % than of the other milk producer.

Access to market information: As expected, this variable was positively associated with the probability of entering into the milk market participation decision with statistical significant level at 5% probability level. As the milk producer obtain milk price and input price information averagely increase than the other producer, Therefore it increases the probability of producer volume milk supply by 3.7 %, all other factors held constant. Farmers constantly make production and marketing decisions; the current market information can help them make choices, from the very first stages of the production planning process up to the moment when the product is actually sold.

Total Land size: As expected, this variable had a positive sign and significant at less than 5% level. The significant and positive sign indicate that the larger land size households allocate for prepared animal feed. The land holding influence on the milk production by efficiently use the land like prepared pasture, hay, and easily to prepare fodder and further to expand the farm size. Therefor it influences the production of milk, the more would be the marketed surplus. DNIVA

(2005) found out that expanding the area under milk increased the marketable supply of the milk. The model output predicts that the milk producer decided to market participation than other producer the reason would be efficiently use the land. The marginal effects further confirm that probability of milk market participation averagely increased by 1.1 % as more landholding.

Access to feed: it contrary to prior expectation the variable negatively and significantly affected household milk market participation. There was statistically significant at 5 % probability level and had a negative effect on the household market participation decision. The result with household revealed that number of household producing milk for market have been increasing in vicinity of towns with aid of purchasing concentrate, feed, forage and pasture from other household. Thus the negative relationship between milk market participation and cost of feed indicates that market oriented dairy production and marketing of milk (related with cost-benefit analysis) the finding coincides with the finding of staal *et. al.* (2006). The marginal effects further confirm that probability of milk market participation decrease by 2 % as more feed access.

4.2.2. Factors affecting volume milk marketed

The second stage of estimation was summarized in table 16 indicated that, the decision of how much household sell, each decision has been studied by using a selection model which included the inverse mills ratio calculated from a probit estimation of the decision to sell in to supply equation. To determine factors influencing the volume milk market participated /marketed surplus/ in milk marketing, OLS regression was estimated in the second stage of Heckman two-step of outcome equation.

Therefore, A total of 15 potential explanatory variables (nine continuous and fife dummy variables including inverse mills ratio) were selected and entered in to the model, out of which 4 variables were significantly influencing the volume of milk marketed participation/marketed surplus/. As it gives the result shows that 4 variables having significance influence on volume of milk marketed were family size, Size of milk output, Age of the household and financial income from nondairy source.

Table 16: The Heckman two-step outcome equation result

Variable	Coef.	Std. Err.	Z	P>z
Sex of household	0.26	0.27	0.96	0.337
Age of household	0.03	0.02	1.67	0.094*
Education level	-0.07	0.12	-0.14	0.891
Family size	-0.21	0.09	-2.46	0.014***
Experience dairy production	0.00	0.02	0.2	0.84
Credit access	0.56	0.29	1.97	0.049
Number of milk calving	0.01	0.14	0.08	0.935
Quantity milk output	0.98	0.01	11.36	0.000***
Milk price	-0.03	0.07	-0.4	0.688
Nondairy source income	0.00	0.00	2.18	0.029**
Distances from market	0.03	0.06	0.5	0.616
Extensions access	-0.06	0.27	-0.23	0.82
Total land size	-0.27	0.25	-1.08	0.279
Feed access	-0.36	0.22	-1.64	0.101
_cons	-2.36	1.32	-1.78	0.075
Mil ratio	0.80	0.37	2.15	0.031

Note: Dependent variable: - milk marketed surplus ***, ** and * are statistically significant at 1%, 5% and 10% significance level respectively.

Source: Survey result, 2017

Family size of the household: As prior expectation this variable was statistically significant at less than 10% significant level and had a negative effect on the household sales volume of milk marketed. The household size has negative and significant effect on volume of milk supply per day per household. The negative and significant coefficient of the variable depicts that the larger household size, the more volume of milk required for domestic consumption and the lesser amount of milk left out for market. The finding is consistent with finding of Edmaeades (2006) and Gebremedhin and jaleta (2010) this implies that keeping other explanatory variable constant. An increase in household size by one member, 0.21 litter decrease in volume of milk supply. This result implies that intervention aimed at promoting family planning amongst farm communities can contribute to commercial transformation of subsistence.

Quantity of milk output: As prior expectation this variable was statistically significant at less than 1% significant. Milk yield per day has positive and significant influence on volume of milk supply per day per household. The positively and significant relationship between the two variable indicate that milk yield per day per household is a very important variable affecting household's volume of milk supply. A positive coefficient indicates that an increased in quantity of milk in the household, which reduce the consumption percentages and it leads to increased volume of market supply of milk by farmers. It also indicates that household who produce more quantity of milk supplying more to the market. The finding is consistent with finding of Birhanu (20013).The result shows that one liter increased in the milk production causes 0.98 liter increased the volume milk supply to market.

Financial income from non-dairy source (FIFNDS): As expected, financial income from non-dairy sources has positive effect on sale volume and found to be statistically significant at 5% level. The positive relation between the variables indicates that any additional financial income enables the dairy household to purchase improved technology, input and more number of improved dairy cows. However the probability of influence on volume of milk market supply it has not impact because the result indicated where zero. Therefor it has not economically impact as the milk producer obtains income from non-dairy source.

Age of the household head (AGEHH): It was a continuous variable measured in number of years. As expected, this variable had a positive relationship with household milk marketed surplus and it was found to be statistically significant at 10 % level. The positive and significant relationship indicates that age is a proxy measure of dairy experience of households. Therefore, as the age of household increased, they would have better knowledge, experience and decide to produce more milk and supply to market. The model output predicts that as the age of the household head increase by one year, the volume marketed increase by 0.035 litters. The finding is consistent with finding of Woldemichael (2008).

Inverse Mills Ratio (Lambda): the inverse mills ratio influences the volume of milk market supply positively and significantly at 10% level of significance. This indicates that there is sample selection bias; which implies the existence of some unobservable milk producer characteristics responsible for producer likelihood to participate supply and thereby the quantity of milk supplied to the market. Or the error term in the selection and primary equation is positively correlated; which implies that unobserved factors that make in participation marketing are more likely to be associated with higher scores on the amount of milk marketed.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary and Conclusions

The country is known to have the highest number of cattle in Africa, making it one of the biggest potential producers of milk and milk products in the continent. Despite this advantage, the industry is plagued with a number of constraints and the country remains a net importer of milk and milk products. The farmers are poorly organized into cooperatives and unions, while their products are sold at sub optimal prices. Lack of demand (market), Lack of processing plant, inadequate provision of veterinary services and lack of continuous supply of animal feeds throughout the year are among some of the challenges faced by the small holder in the field. However the dairy development has a big role for the contribution of income generation and employment purpose. Hence, the situation of dairy marketing issues in Gondar is needed to discuss and analyzed.

The main objectives of this study were to analysis dairy marketing chain in Gondar city with specific dairy product that is milk and butter. The study also initiated to generate baseline information on milk market participation decision and volume of milk supply to market at household level. The study an attempt has been made to evaluate the results of socio-economic characteristics of dairy producer and trader. It also summaries the empirical results of Heckman two-stage model result.

The study undertaken in six purposively selected based on the production potential area, namely Anchew, Sabiya Sayena and Defecha ,Gbreal kefeleketema, Arbeghoche and Maraki kifeleketema. Producer from each urban and pere urban kebele were selected using probability proportional to size of sampling techniques. While for trader using two major butter market sites were purposively selected namely Arada and Azezo markets based on accessibility and potential.

For the study a total of 228 respondents (204 of producer and 24 milk and butter traders) sampled were selected interviewed using semi- structural interview for formal survey. Rapid

market appraisal, focus group discussion and key informants interview were also conducted; secondary data were also collected from different sources. The households themselves were the respondents. The traders also were interviewed with independent semi-structured questionnaire. The data was analyzed using descriptive and econometric methods. Therefore, the analysis and interpretation of the data results are followed.

The result shows that out of 204 sample farmers, 41.9% of market participant were male headed, while 58 % were female headed. On the other hand, 77.46% of non-market participants were male headed households, while 22.5 % of non-market participants were female headed households. The average age of market participants was 53 years while that of non-market participants 50.41years. The overall mean age of milk producer was 52.4 years old. In terms of family size, the average family size of market participants was 5.8 members, while for non-market participant's 5.6 members. Land size shows that the average land size owned by market participants was 0.77 hectares, while that of non-market participants was 0.39 hectares. In terms of milk yield, the mean of milk yield produced by market participants per day was 21.4 litters while that for non-market participants was 2.85 liter. Distance to the nearest market shows that the average distance to the nearest market for market participant was 2.54 kilometer, while that of non-market participant was 3.3 kilometer. Education status shows that 83.3 % of market participants were literate, while 16.6% was illiterate. On the other hand, 77.7 % of non-market participants were literate, while 22.2 % was illiterate. In terms of credit access 9.8 % of market participants were gets credit access while 56.8 % was not getting credit. On the other hand, 5.8 % of non-market participants was get credit access, while 24.5% of was not get credit access. Access to market information shows that, about 56.8% of market participants were get market information, while 12, 7 % were not got market information. On the other hand, 13.2 % of non-market participants were get market information, while 17 % was not get market information. In terms of access to extension service on marketing, about 71.5 % of the sample respondents had an access on extension service of marketing while 28.43 % did not get access.

Milk and butter product passes through different channels before it reaches the end users/consumers. Major dairy actor in the study area where identified producers/farmers, rural assemblers, hotel, cooperatives, retailers and semi-wholesalers. There are 8 and 7 main alternative marketing channels of milk and butter were identified, in milk channel (Producer→

cooperative → Retailer → Consumer) while butter Producer → semi-wholesaler → retailer → consumer are carries the largest volume of milk and butter transacted

The structure of milk and butter trader market indicates that the four traders' concentration ratio (CR4) for milk trader was about 71.79 % and while for butter trader 64.74% market concentration. The result indicates that for both markets is strongly oligopolistic. There for, milk market showed strongly oligopolistic structure. This indicated that, there is market imperfection because of few traders like the union of cooperative seems to have monopolized the milk markets The structure of milk and butter market has also characterized by barrier to entry in Gonder town market. The major barriers to entry that enter into butter and milk marketing were adult ratio problem , lack of working capital, administrative problem and stiff competition with unlicensed traders. This is indicating that the deviation of milk and butter market from the competitive market structure.

Regarding market conduct about 55 % and 65 % of milk and butter producers sold their on cash basis, while the remaining payment is conducted through advance payment for both dairy productions. 64% of the sampled traders' purchases butter from farmer and rural assembler the remained 36% from other actor. The pricing strategy of indicates that with respect to decision on butter and milk selling price set. Out of total set price 14.8%, 24%, 16, 5 % and 44.7% of butter was set by themselves, by market price, by buyer and negotiation respectively between seller and buyer. While 12.4%, 37%, 14.6% and 36% of the selling price of milk was set by themselves, by market price, by buyer and negotiation respectively between seller and buyer

The market performance of milk and butter was measured using indicators of marketing margins. About 30% of total gross marketing margin was added to milk and when it reached the final consumer. The producers' shares of price to the end users were 69.94 %. Therefore this situation implies that there was poor performance (inefficiency) of milk market chain. While the butter price of total gross marketing margin was 18.42 % added to butter price when it reached the final consumer in the study area markets. The producers' shares of price to the end users were 69.94 %. Therefore this situation implies that there was efficiency of butter market chain. Because of the total gross margin is less than 20% the optimal.

Generally the marketing system for butter and milk was predominantly traditional and

fragmented, and characterized by no licensing requirements to generate the operation. Adulteration was a bottleneck in both milk and butter marketing. It also characterized by under developed and inefficient type of market for both milk and butter. The existing situations with regard to dairy production service sector were not encouraging. Market suppliers, milk process plant, the cost and access of concentrate feed and access to credit where very week

Based on the Hickman two stage analyses, the study had identified the determinant of market participation decision on milk marketing and its effect on the marketable supply. Five variables were found to be significantly influencing the milk market participation decision the result indicates that Size of milk output, total land size and access to market information averagely increased milk market participation positively influence on the other hand, family size and access to feed averagely decrease the households' participation decision to sell milk. While family size determines volume of milk sale negatively but Size of milk output and age of the household increased the volume of participation in milk sale positively correlated. Whereas nondairy income had significantly but it has not influence on economically value.

Generally the result of the first step of the Heckman two stage procedures model analysis has shown that policy relevant variables having greatest impact on milk market participation decision were size of milk output (milk yield), access to market information, and access to land, family size and access to feed. While for volume of milk supply where size of family size, age of household, quantity of milk output and income from non-dairy source. That means statistically and economically influenced. Therefore, Government and other existing and potential dairy sector development partners of the study area should focus on increasing milk production and productivity of the sector.

5.2. Recommendation

On the basis of the results of this study, the following policy implications are recommended so as to be considered in the future intervention strategies which are aimed at the promotion of dairy production and marketing in the study area in particular and in the country in general. The result of the first step of the Heckman two stage procedures (Probit) model analysis has shown that policy relevant variables having greatest impact on milk market participation decision were size of milk output (milk yield), access to market information, access to land, family size and access to feed.

As it was seen from the model analysis, quantity of milk output has strongly statistical and economically significant impact on both milk market participation decision and sale volume of milk ether per day or monthly. Therefore, police proposed should focus on increasing milk production and productivity of the sector. Government and other existing and potential dairy sector development partners of the study area would require farmer to use good husbandry system, select good breeds, properly feeding and balanced diet. Moreover achieved through identifying new technical and husbandry management practices that could improve the production and productivity of the dairy cattle by creating stable demand for surplus production would also enhances farmers decision on milk production consistently. It also promote large private investment, which at the end will introduce new technology in the sector such as improved genotypes, feed and processing, and as smallholders will likely continue dominating the sector, government should also promote integration of crossbred cattle into the smallholder sector through improving their access to improved cattle breeds, AI service, veterinary service, and credit.

Having the second greatest impact on both milk market participation and supply volume of milk where access to market information. Concerned body should avail market information available to farmers at the right time and place. In response to this challenge, it is good to develop an integrated agricultural marketing information system that will be linked to district information center, and to link them to government's program. Policy makers should provide market price information through different alternative

- Stakeholder must provide information through radio and TV broadcast the price information and phone-in programs
- Provide regularly updated or current price market information for producers, traders, and consumers through different alternative
- Provide market information through Radio Call-in Shows
- Promote and provide covering various benefits of trading and SMS market information system through educational radio spots
- Provide a minute duration for TV program
- Created the minister of livestock on TV talk shows on various agricultural dairy products.
- Develop SMS market information system to receive SMS text messages from traders containing the wholesale selling prices products. Therefor it encourages market participation decision of farmers.

The probit model analysis result has shown that dairy household milk market participation decision was positively and significantly affected by total Land size. Therefor land is one of the most important inputs for dairy farming. Due to the reason to prepare improved feed by planting different types of grass like alfalfa, straw , animal to graze and farm to expand for milk production increment and to minimize cost of feed to be purchased. Therefor the government should focus to access the land. Accessing land resource shortage such as feeds and waters were one of the major problems identified and prioritized by milk producer in the study area. To reduce this problem it is essential local governmental access the land or by rent. Unless provide extension to use efficiently the land.

Income from non-dairy source of dairy household was found to affect the sale volume of milk positively. The positively related value of the variable suggests that through improving liquidity, this income makes the household to improve sale volume of milk through expanding dairy production. Therefore, increasing the dimension of access to well-functioning formal financial systems is critical in influencing sale volume of milk per day per dairy household.

The feed access result has shown that dairy household milk market participation decision was negatively and significantly affected by feed access. Feed where one of the major problems identified and prioritized by dairy producer in the study area. To reduce this problem it is

essential to integrate improved feed by planting different types of grass like alfalfa, straw to minimize cost of feed and availability to be purchased.

The household size has negative and significant effect on both milk market participation and sale of volume of milk supply per day per household. The negative and significant coefficient of the variable depicts that the larger household size, the more volume of milk required for domestic consumption and the lesser amount of milk left out for market. Even though production is the function of labor, larger family size requires larger amounts for consumption that contributed to reducing marketed surplus. Therefore, police proposed should focus on increasing milk production and productivity of the sector this result implies that intervention aimed at promoting family planning amongst farm communities can contribute to commercial transformation of subsistence or efficiently use the labor. Potentially, collective organizations like dairy cooperatives are assumed to play important role in improving the bargaining position of the dairy producers and creating employment opportunities, lowering transaction costs and reducing the level of oligopolistic market type by creating competitive market as it was seen in the survey dairy producers cooperatives.

The formation of dairy producers cooperatives must be offset against its cost and their success must be evaluated relative to the alternative uses of the resources required to create them. In line with this, government actions are required to provide enabling and supporting environment such as management of co-operatives and self-help groups, support of market information flows (e.g. market opportunities and prices), resources for training in management and planning and where appropriate, greater access to credit, dairy marketing policies, and greater consistency in their implementation.

As seasonal fluctuation of demand for milk and butter associated with their perishable nature was vital problems of dairy marketing of the study area, development and promotion of small- scale processing technologies were critical to increasing smallholder producer's dairy production and dairy products market participations. The survey result indicated that the overall milk and butter marketing system was found to be traditional and under developed, fragmented and inefficient. Thus, government actions are required to license and inspect competing dairy product traders to

ensure achievement of minimum hygiene and quality standards in order to facilitate the dairy production and marketing.

General in the study areas it has to be strengthening through either by redesigning/reforming the implementation strategies or improving and strengthening the existing policy design. Dairy market price information has to be disseminated through public sector such as extension agent or public media as the model output identified it exerting positive impact on dairy market participation and volume of marketable surplus.

Generally the policy maker should be done the following activity to alleviate the milk market problem

Informal Milk marketing

- Registration and special licensing of milk traders
- Provide basic knowledge on milk quality and safety
- Provisions of standard milk collection, handling and transportation equipment
- Transformation and promotion of raw milk trade to small scale milk preservation and processing technology

Milk Processing

- Facilitation of collection, chilling and transportation facilities for dairy producer
- Established collective organization

Packaging

- Facilitation by government in forming clustering to producing and printing of low cost but with a minimum standard of quality

Consumption

- Promoting milk consumption and nutritional value
- Promotion of school milk feeding program
- Aggressive involvement by Government on the dairy industry

- Promotion of collection, chilling and transportation facilities in order to increase the supply

Demand seasonality

- Promoting extended shelf live dairy products
- Promoting consumption of children,

Financial Services loan

- Government needs to ensure that state owned banks have both the institutional capacity in administering Dairy related loans.
- Considering a system to use livestock as collateral in such a way that risks of the

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7. APPENDIX

Appendix7. 1: Interview schedule

General Conditions

Date of the interview; Date _____ Month_____ Year _____

Name of the kebele (PA): _____

Name of the village _____

1. Gender: Male Female

2. Age of household head in year --------

3. Marital status: 1. Married 2. Single 3.Widow 4. Divorced

4. Religion (Put a circle) 1= Christian 2= Muslim 3= others (specify) _____

5. Education level: 1. Illiterate [ ] 2. Read and Write [ ] 3. Primary [ ] Secondary [ ] (4) high level

5.1 How many of children are in school_____

6. Family size

6.1 Number of household members (how many family member do you have _____

7. Experience in milk production)

7.1 For how long you have been engaged in milk production/dairying activities? _____

8. **Access to credit (Amount of loan received in birr for last one year).**

8.1 Did you received any loan Yes [ ], No [ ]

8.1.1 If yes from where you received the loan

1) Government

2) NGOs 3) Formal financial institution 4) Relative 5) others, specify_____

8.1.2. If yes how much you received for the last three years. Amount of Loan received for the last year by the household in Birr_____

9. Size of milk output (total milk produced)

9.1 How many milk produces per day in liters? _____maximum _____minimum_____

Lactation length (how many day lactating) in day or month.

10. Participation in milk marketing

10.1Do you sell (supplied) to the market? If yes--- no ---

11. Marketed milk volume

11.1 If you yes to milk supplied to market .Quantity of milk and milk products supplied to the markets per day at house hold level and type of market recovers

11.1.1 How many litter produced per day in litter _____

11.1.2 How many litter sold to the market ----------

11.1.3 How many of the produced milk you use for household consumption per day in litter---

11.1.4 How many litter donate for other

2.5 How many litter used for processing

12. Market price

12.1 How much selling per litter ----------

13. Size of milking cow

13.1 How many milking cow do you have ----------

13.1.1 Local breed ---------

13.1.2 Cross breed ---------

13.2 Which breed of milking cow do you like to keep in the future or now profitable?

Cross breed

Local breed

13.3 Local: how many litter produced per day ----or lactating day -----

13.4 Cross breed: how many litter produced per day ---or lactating day -----

Breed type	**Number of dairy cows**	**Number of milking cows**	**Yield/day (Liters)**
Crossbred cows			
Local cows			
Total			

14. Total land size

Do you have land? Yes or no

If yes how many hectare -------

15. Income from non-dairy activities in birr for last twelve months (in one year).

15.1 Do you participate in other type of works out of milk production and crop production (Yes--------No------) put √ mark

15.2 If yes on what type of job you are engaged? In off farm, on farm-----

15.3 For how long you are engaged per a year?

15.4 How much you earn from the job per a day, per a week, per a month or per year in ……birr

15.5 If no why?

_____

_____

16. **Distance to the nearest market**

16. How far is the nearest market for milk marketing in _____Km, or time it takes to reach on foot in_____ hrs?

16. Distance to the nearest dry weather road; __ km, walking time ____ hrs.

17. Access to extension service (Exposure to Extension Services);

17.1 Do you have access to livestock extension services? 1. Yes 2. No

17. 2. If yes, mention how often you were visited in the last twelve months?

1) Weekly 2) Monthly 3) Yearly 4) Never happen

15.3. Did you find the advice from extension agent adequate 1? Yes 2. No

15.4. If no, what else you needed to be advised? Specify

_____

18. Access to marketing information

18.1 Do you get market information? Yes or No

18.2 If the answer is yes how do you get this information? Through,

1) Mass media 2) milk-group 3) neighbor who come from market 4) Others, specify

19. Are there problems on milk producing? If yes what are the problems, and your suggestion to overcome each Problem in 2016?

20 Suggestions for improving milk marketing participation

Appendix Table 7.2: Muiticolinearity test

Appendix Table 7.2.1: Variance Inflation Factor (VIF) Test for Continuous Variables

Variable	VIF	1/VIF
SOMO	3.62	0.276595
NOMC	3.55	0.282072
EIDP	1.79	0.558998
FS	1.68	0.595895
TLSE	1.64	0.608724
MP	1.29	0.775260
FIFNDS	1.22	0.822795
Mean VIF	2.11	

Source: own computation from survey data, (2017)

Appendix Table 7.2.2: Contingency coefficient for dummy variables

Variable	SHH	ELHH	CRADIT	EF	ATMI	TLSE	FEEDA
SHH	1.0000						
ELHH	0.0982	1.0000					
CRADIT	-0.1171	-0.1669	1.0000				
EF	0.1086	0.0982	0.0224	1.0000			
ATMI	0.1105	-0.0296	0.0650	0.2292	1.0000		
TLSE	0.1840	0.0593	-0.0798	0.1694	0.0973	1.0000	
FEEDA	-0.0857	-0.0836	0.0933	0.1130	-0.0243	-0.0847	1.0000

Source: own computation from survey data, (2017)